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VOL. XV NOVEMBER, 1932 No. 11

HYPERPARATHYROIDISM*

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Rochester, Minnesota

IF THE age of a clinical entity be judged by the date of its recognition, then hyperparathyroidism may be termed a new disease. Yet, in spite of its belated recognition, there are today but few maladies, old or new, of which the mysteries have been so speedily and completely solved as those of the disease under consideration. When it is recalled that less than a decade ago there was little or no exact information concerning the relationship of the parathyroid glands to certain types of osseous dystrophy, it is readily appreciated that the recently acquired knowledge of this disease represents one of the most brilliant achievements in the history of medicine. For, within a remarkably short period, this clinical entity has been definitely recognized, its pathogenesis fully established, the condition experimentally produced in animals, and arrest of its progress or cure of the disease effected.

Knowledge of this disease has been revealed gradually, through a series of observations and researches, each in itself an important and interesting event, and together they constitute a fine and deserved tribute to modern collaboration between clinical and experimental researches. In 1891 von Recklinghausen described certain skeletal changes which he termed "osteitis fibrosa" characterized by generalized softening and deformity of the bones, with the presence of reddish brown tumors (osteosarcomas). The decalcification was so advanced that the bones could be readily cut with a knife. He recognized features in this condition which distinguished it from those of osteomalacia. Since then many cases of this sort have been reported in the literature. The course is slowly progressive, with few symptoms other than bone pain, muscular weakness, and skeletal deformities and fractures. The essential pathologic findings are extensive replacement of bone marrow by fibrous tissue, rarefaction of the cortex, and frequency of giant-cell tissue and cysts. A number of observers have reported as an associated finding frequent metastatic deposits of calcium in the various organs of the body, especially the kidneys, lungs, and arteries. In a case reported by Dawson and Struthers, deposits of calcium in the form of fine granules, which in some instances became confluent masses, were present in all the internal organs and in all the tissues of the body. At first, von Recklinghausen regarded these changes as inflammatory in origin, simulating osteitis deformans, but it is of special interest that later, in a posthumous publication (1910) he classified osteitis fibrosa with the metaplastic malacias. Meanwhile, in 1904, Askanazy for the first time reported the finding at necropsy of a parathyroid tumor associated with generalized softening of the bones (osteitis fibrosa). The patient, a woman, aged fifty-one years, had complained of pains in her limbs, and had sustained multiple spontaneous fractures. No special significance was attached to the associated presence of the parathyroid tumor, although in the previous year Erdheim had suggested possible relationship between the parathyroid glands and decalcification of bones; he based the suggestion on his observations of enlargement of these glands in osteomalacia. Although at this time little was known of the function of the parathyroid glands, other than the fact, first completely demonstrated by Vassale and Generali, that removal of these bodies led to fatal tetany, the observations and discussion of Erdheim stimulated more careful search for parathyroid en-

*From the Division of Surgery, The Mayo Clinic, Rochester, Minnesota. Read before the Minnesota State Medical Association, St. Paul, May 23 to 25, 1932.

largements associated with osseous dystrophy. Thus, by 1925, Hoffheinz had reviewed forty-five reported cases of "measurable" enlargement of the parathyroid glands. In twenty-seven of these there were skeletal changes: osteitis fibrosa in seventeen, osteomalacia in eight, and rickets in two. Erdheim's interpretation of enlargement of the parathyroid glands in osteitis fibrosa, as well as in osteomalacia and rickets, was that compensatory hypertrophy was effected by the pathologically disturbed metabolism of calcium. This disturbed metabolism had been first demonstrated by Jacoby and Schrott (1912) in the discovery of an abnormally high excretion of calcium by a patient with this disease. On the basis of this conception, Mandl, in 1925, transplanted four parathyroid bodies into the abdominal wall of a man with generalized osteitis fibrosa. Since no improvement in the patient's condition followed this procedure, he explored the neck and found a parathyroid tumor. The early disappearance of the pain in the bones, the marked reduction in excretion of calcium in the urine, and the general improvement in the patient's health that followed removal of the tumor constituted the first clinical evidence that in this disease the parathyroid lesion is primary and the skeletal changes secondary. The advances thus far achieved, chiefly through clinical observations and researches, naturally evoked many questions concerning the physiology of the parathyroid glands, as well as concerning its relationship to the physiology and pathology of bones. It was already well established that these glands were specifically concerned in regulating metabolism of calcium. After removal of the parathyroid glands of the dog, MacCallum and Voegtlin (1908) found marked diminution of the serum calcium, and showed that the symptoms of tetany could be partially relieved by intravenous administration of calcium salts. These findings were later amply confirmed by Howland and Marriott (1918), who after establishing the level of concentration of calcium among normal persons (9.2 to 11.3 mg. in each 100 c.c. of serum), found a decided reduction of calcium (average 5.6 mg.) among patients with tetany of idiopathic origin. The experiments of Greenwald on parathyroidectomized dogs suggested that these glands played a definite part in metabolism of phosphorus. He observed a diminished output of phosphorus after removal of the parathyroid glands.

Beyond these observations, progress in knowledge of the physiology of the parathyroid glands came to a standstill until Hanson (1924) and Collip (1925) isolated a potent parathyroid extract. When this active principle became available for experimental purposes, new facts on the physiology of the glands were rapidly brought to light. Collip showed that administration of the hormone to parathyroidectomized dogs would raise the concentration of serum calcium, with relief of symptoms of tetany; that it would elevate the level of blood calcium in the normal dog, and that repeated injections would produce hypercalcemia. The hypercalcemia thus induced was associated with symptoms of drowsiness, loss of appetite, muscular weakness, vomiting, diarrhea, failing circulation, collapse, and death. The animals became dehydrated, and their blood exceedingly concentrated. Important discoveries of the effect of parathormone on metabolism of calcium and phosphorus were made by several independent observers. After injection of toxic doses into the dog, Greenwald and Gross (1925) found, besides the hypercalcemia, great increase in the excretion of urinary calcium and phosphorus. Hunter and Aub (1926), made the important observation that when parathormone was given to patients who were under treatment for chronic lead poisoning, the level of serum calcium may be only slightly elevated; yet there is a rise in the excretion of urinary calcium to several times the normal level. Although Collip had observed, in his earlier experiments, that there is an abrupt rise in phosphorus of the blood after a certain critical level of calcium of the blood has been reached, other investigators (Brehme and György, and Reis and Aub) found that injection of parathormone was quickly followed by lowering of phosphorus in the blood. From the experiments of Albright, Bauer, Ropes and Aub, it would appear that the first metabolic changes following administration of parathormone are rise in excretion of phosphorus and fall in the value for serum phosphorus, and that the rate of excretion of calcium and the increase in value for serum calcium are more sluggish. Other phenomena of overdosage were the production of myotonia and the occurrence of deposits of calcium widely distributed over the body, especially in the kidneys, lungs, heart,

and so forth. The negative calcium balance induced by injection of parathormone naturally led investigators to presume that the extra calcium must be derived from the bones, and in 1929, Bauer, Albright, and Aub showed that the trabeculæ became diminished following long-continued administration of parathormone to rabbits. However, they found no gross effect on the cortex of the bone. In the meantime, other cases of osteitis fibrosa were studied, and when disturbances in metabolism of calcium and phosphorus were found comparable to those produced by administration of parathormone, the similarity between the two conditions was at once recognized. When the concentration of serum calcium and serum phosphorus in these cases was restored to normal by removal of parathyroid tumors, then evidence of the parathyrogenic origin of generalized osteitis fibrosa became convincing.

Although all the features of generalized osteitis fibrosa except the characteristic lesions in bone had been produced experimentally by administration of parathormone, absolute proof of the endocrine origin of the condition was still lacking. However, the final proof was soon furnished by two independent groups of investigators: In 1930, Jaffe and Bodansky were able to inject Collip's parathormone into puppies in increasing amounts for a long period of time without fatal results. "These injections led to progressive decalcification and resorption of the existing bone to fibrous replacement of the marrow, and to the production of other features characteristic of 'osteitis fibrosa.'" In the following year, Johnson, working under the supervision of Wilder at the University of Chicago, not only confirmed these investigations, but demonstrated that the results of prolonged administration of parathormone were not materially influenced by simultaneous administration of irradiated ergosterol, indicating, therefore, that this disease is not etiologically related to such diseases caused by deficiency of vitamin D, as osteomalacia and rickets.

Hyperparathyroidism is then the antithesis of tetany. In man it occurs spontaneously as a chronic and slowly progressive disease, caused by the excessive secretion of hyperplastic or adenomatous parathyroid glands, and manifested by the following clinical features: (1) high concentration of serum calcium; (2) low concentration of serum phosphorus; (3) abnormally excessive excretion of calcium and phosphorus in the urine, resulting in a negative balance of these metals; (4) pain and tenderness of bone; (5) hypotonia and muscular weakness; (6) radiologic evidence of generalized decalcification of the bones, with or without deformities, cysts and tumors, and (7) commonly, anemia and loss of weight. According to Hunter, the condition is reported as occurring twice as frequently among women as men; the ages at which it is most common are thirty and fifty-five years. Other symptoms observed in four cases of hyperparathyroidism previously reported from The Mayo Clinic included gastro-intestinal disturbances: anorexia, constipation, spells of nausea and vomiting and abdominal cramps without relationship to taking of food. Two patients had polydipsia and polyuria; the twenty-four hour output of urine of one of them ranged between 5 and 7 liters. In one patient profound lassitude was so prominent a feature as to constitute apparent utter indifference to surroundings. Nephrolithiasis, a not uncommon finding in reported cases, was found in two of the cases seen at the clinic. As the disease advances, muscular weakness progresses, walking or even sitting becomes difficult or impossible, and general wasting becomes pronounced. Deformities of the bones, such as compression of the vertebræ and pelvis and bowing of the legs, resulting in shortening of the patient's stature, are common and prominent features of advanced cases.

The diagnosis of hyperparathyroidism is possible only by correlation of symptoms and the laboratory findings. Evidence of increased rate of metabolism of phosphorus and calcium, and of generalized osteoporosis, in a case in which there are signs of bone pain, hypotonia, and muscular weakness, furnish absolute proof of the diagnosis of this syndrome. Increased concentration of serum calcium, and reduced concentration of serum phosphorus are of great diagnostic importance. In Hunter's review of thirty-two cases in which there was satisfactory proof of the presence of hyperparathyroidism, the value for serum calcium varied between 12.6 and 23.6 mg. in each 100 c.c., and the value for serum phosphorus between 1.0 and 2.7 mg. in each 100 c.c. As hypercalcemia has been reported to occur in association with other diseases, such as gout and polycythemia vera, and

following ingestion of irradiated ergosterol, its presence is therefore not distinctive of hyperparathyroidism. On the other hand, it is possible in this disease for the value for serum calcium to be within the accepted range of normal, or only slightly elevated. The increased output of calcium in the urine would appear to be of greater significance in estimating the rate of metabolism of calcium than the level of the serum calcium, for it is recalled that both Hunter and Aub, and Johnson and Wilder, after administering parathormone to man, observed only a slight rise in the value for serum calcium, while excretion of calcium in the urine rose to several times the normal level.

Roentgenologic evidence of generalized decalcification of bones is of extreme diagnostic value. Camp has described these changes as a uniform, miliary, granular mottling, best observed in the skull, thinning of the trabeculæ and cortex, and the presence of areas of subperiosteal absorption in the long bones and phalanges. In addition, there may be single or multiple cysts, deformities and fractures. Apparently these changes are characteristic of the disease, since in three of four cases it was possible for Camp, on the basis of these features alone, to suggest the possibility of hyperparathyroidism before the diagnosis had been otherwise suspected. Since the symptoms, as well as any evidence that can be obtained in the usual examination of the patient in the early stage of this disease are not distinctive, it is apparent that without some suggestive clew the diagnosis may be readily overlooked. Since it is not practical to have complete metabolic studies of all patients who present more or less vague symptoms of weakness and bone pain, I am confident that in the future the unsuspected radiologic evidence of generalized osteoporosis discovered in the usual roentgenologic examination will constitute, in many cases of this disease, the first clew to the diagnosis.

In considering the operative treatment, it is important to emphasize three errors which the surgeon is likely to commit:

1. The difficulty of finding a tumor may be exceedingly great, owing to the wide variation in distribution of such tumors, and if a tumor is not present on the surface of the thyroid gland, the surgeon is likely to conclude that there is no tumor, and to close the wound after removing one or more normal parathyroid glands. The situation of the parathyroid glands is not constant: they may be contiguous to the thyroid gland, anterior, lateral, or posterior, they may be embedded within the substance of the gland, or they may be separated from the gland, occupying positions outside the fascial compartment of the thyroid gland, high in the neck or down in the thorax. It is obvious, therefore, that wide exposure is demanded and that the presence of a tumor cannot be excluded until thorough search has been made in the neck, as well as in the upper mediastinum.

2. The possibility of the presence of more than one tumor must always be considered. Of the thirty-two cases in which Hunter found satisfactory proof of hyperparathyroidism, in twenty-one a parathyroid tumor was removed at operation, in two cases two parathyroid tumors were removed, and in four cases no parathyroid tumor was found at operation. Of the five remaining cases in which operation was not performed, in four, tumors were found at necropsy, in three cases one tumor, and in one case two tumors. Recently Walton reported a case illustrating these technical problems. At operation a search in the usual sites of the parathyroid bodies did not reveal a tumor, and a small mass in the lower pole of the thyroid gland was removed in the belief that it might be a parathyroid tumor. However, on section this proved to be thyroid tissue, and since its removal was not attended by any material chemical changes in the blood, Walton opened the wound five days later. He then incised the deep layer of the cervical fascia which forms the bed of the thyroid gland, and two parathyroid tumors were found and removed. One tumor was lying behind the esophagus, and a second, larger retrosternal tumor was lying in front of the second and third thoracic vertebræ. Since learning of Walton's experience I consider the chances exceedingly great that I failed to find a parathyroid tumor in the case reported by Ball. At the time when subtotal thyroidectomy was done for a hyperfunctioning adenomatous goiter I was confident that no parathyroid tumor was present, although as I now realize, my search did not extend far enough.

3. As these tumors are commonly found posterior and more or less adherent to the thyroid gland, in close proximity to the recurrent laryngeal nerve, I have found that in some instances their removal is simplified if the inferior thyroid

artery is previously ligated proximal to its entrance into the gland. This procedure will lessen the chance of bleeding when the tumor is removed, and therefore will minimize the danger of injury to the nerve.

Operative removal of a parathyroid tumor from a patient with this disease is followed by dramatic changes. Almost immediately there is a tendency toward a restoration to normal of metabolism of calcium and phosphorus. Allan's case is perhaps typical: within five hours the concentration of calcium in each 100 c.c. of serum dropped from 16.7 mg. to 14.0 mg.; within twenty-four hours, to normal, and within forty-eight hours it had fallen to a subnormal level, with evidence of tetany of moderate severity. This persisted for more than three weeks in spite of vigorous treatment with parathormone, calcium and irradiated ergosterol. Eventually the value for serum calcium rose to normal, and treatment was gradually discontinued. The rapid decrease in excretion of calcium and phosphorus was equally as marked as the changes in the values discovered on chemical examination of the blood. Tetany has often been observed as a postoperative complication, but commonly it is transient, responding quickly to treatment. It was fatal in one reported case.

The early relief of pain has been a prominent feature in many of the reported cases. Gradual improvement in health has been observed in practically all the cases, as evidenced by disappearance of gastro-intestinal disorders, by gain in weight and strength, and in some instances by ability to resume normal occupation. In many of the cases, increase in density of the bones, with diminution in the size of the bone cysts, has been noted several months after operation, whereas in others no apparent change could be detected years afterward. Improvement in the osseous lesions is slow and probably is largely dependent on the extent to which the disease has progressed at the time treatment is instituted.

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VACCINATION PREVENTS SMALLPOX: AN ANSWER TO THE ANTI-VACCINATIONIST

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VACCINATION against smallpox is an inoculation of human beings with cowpox. This means of prevention was introduced to the world by Dr. Edward Jenner of England in the year 1798, following epidemics of that terrible disease. Since that time some countries and some of our states have passed laws making vaccination compulsory. Too little attention is paid by the public to this very important subject. The public takes action and coöperates with the medical profession in being vaccinated only during or following an epidemic.

We as physicians have continuously to contend against the inertia of the people and, in addition, against a systematized program of propaganda against vaccination which is misleading and which emanates from certain cults, faddists, and misled cranks. They are teaching the people that vaccination is unclean and dangerous. On the other hand, the medical profession knows that vaccination protects against smallpox. It is, therefore, incumbent upon us, as physicians, to vigorously disseminate the truth about vaccination.

To illustrate the pernicious character of the propaganda put forth by these enemies of public health, we shall later quote in full a pamphlet recently circulated from Minneapolis, and then we shall turn back the pages of smallpox history for ourselves to the time mentioned in the pamphlet. We shall see how deliberately false such propaganda is, and we shall note the fact that both the incidence of smallpox and the number of unvaccinated persons are increasing. From this we shall come to a conclusion, and finally we will consider the remedy.

Certain accidents and sequelæ have been attributed to vaccination. Despite the large number

of vaccinations, a procedure practised all over the world, there have been very few accidents therefrom. Vaccination has been blamed for many complications but it is a common human failing not to be able to distinguish mere sequence from actual consequence. People may contract tuberculosis, skin diseases, or what not after vaccination, as they may after any other incident in their lives.

An encephalitis, somewhat similar clinically to lethargic encephalitis, but pathologically said to be more like disseminated sclerosis, has been reported since 1922 in the Netherlands and in England with but scattered isolated cases elsewhere. The symptoms are said to start nine to thirteen days after the vaccination so that the disease is apparently a consequence of vaccination, but this is by no means proven. In Public Health Reports, Vol. 47, No. 30, July 22, 1932, Dr. Charles Armstrong, Surgeon, U.S.P.H.S., reviews the subject of post-vaccination encephalitis. Some 700 cases have been reported the world over during the last ten years with a 40 per cent case fatality rate, seventy-one cases having been reported in the United States. He has done some experimental work on mice which indicates that previous immunization with diphtheria toxoid prevents this encephalitis. This disease does not follow secondary vaccinations nor primary vaccinations done in infancy. The most important practical fact about this encephalitis is its great rarity compared to the great number of vaccinations done the world over, so that fear of encephalitis is no reason to let up on our vaccination efforts against smallpox.

Anti-vaccination cranks have seized encephalitis as an addition to their propaganda. They have the audacity to go to health departments, where they ask for and obtain the number of deaths from encephalitis and poliomyelitis during the previous year, and then they boldly publish the inference that all these deaths were due to vaccination. They do not, of course, investigate these deaths to see if these people had been recently vaccinated against smallpox, or even if vaccinated at all. The people who read these papers believe them, for they are easily misled.

Not long ago a child brought a printed sheet to school to show her teacher. This finally reached the city health department, and is here quoted entirely and exactly as printed:

"THE HEALTH PROTECTOR

No. 1. May 14, 1932

"The Truth About Smallpox and Vaccination in Minneapolis, Minnesota.

"Ever since Minneapolis experienced a smallpox epidemic in 1924 and 1925, the public has been given to understand that neglect of vaccination was responsible for the epidemic, and that vaccination stopped the epidemic.

"The facts regarding smallpox and vaccination in Minneapolis for a period of 32 years, from 1900 to 1931, inclusive, and in particular the facts about the 1924-1925 epidemic, are here presented for the first time.

"Vaccination was compulsory in Minnesota until 1903. In that year the compulsory law was repealed. In 1900, with vaccination compulsory, 10 persons died of smallpox in Minneapolis. In 1901 there was only one death, and in 1902 none, but in 1903 there were 10 smallpox deaths, and 17 more were recorded for 1904. According to standard medical teachings, these two years following directly after a long period of compulsory vaccination should have shown a very high percentage of immune persons and practically no smallpox, and yet they produced a total of 27 smallpox deaths.

"From 1905 to 1918, inclusive, with vaccination becoming steadily less and less each year, there were only 11 smallpox deaths in Minneapolis for the entire 14 year period, with 3 such deaths the most recorded for any one year, and 7 years showing no deaths at all from smallpox. Only 11 smallpox deaths in these 14 years during which vaccination was steadily lessening, as compared with 38 smallpox deaths during the 5 preceding years, in 3 of which vaccination was compulsory, and in the other 2 years directly following with the population largely vaccinated.

"In the fall of 1919 a general vaccination campaign was started in Minneapolis. Publicity favoring vaccination was spread through the press and from the platform, the coöperation of employers of labor was secured to have all their employees vaccinated, and our schools were used for the circulation of vaccination propaganda. This continued, until in 1923 those interested in the promotion of this wholesale vaccination gave out interviews to the press claiming that Minneapolis was one of the most thoroughly vaccinated cities in the United States, and probably in the whole world, and, because of this, one of the best protected cities against smallpox to be found anywhere.

"There were 2 smallpox deaths in 1919, none in 1920, 3 in 1921, 1 in 1922, and none in 1923, 6 smallpox deaths in these 5 years while the general vaccination campaign was under way.

"The promoters of vaccination continued their wholesale vaccination drive through 1923, and until June of 1924, when malignant smallpox in its worst form broke out in this city of Minneapolis, which the public had been told was so exceptionally well protected against smallpox by vaccination, and the most deadly epidemic

of smallpox ever known in the city, the worst smallpox epidemic ever known in the entire history of the State of Minnesota rapidly developed.

"221 persons died of smallpox in Minneapolis in 1924, and there were 144 additional smallpox deaths in the city for 1925, a total of 365 deaths from smallpox in Minneapolis for the two years, *more than six times as many smallpox deaths in Minneapolis for just these two years as there were in the city during the entire remaining thirty years from 1900 to 1931, inclusive,* and bear in mind that these 365 smallpox deaths followed directly after one of the most thorough vaccination and revaccination campaigns in Minneapolis ever conducted by any city in the whole world.

"Besides these 365 smallpox deaths, more than 100 persons died of encephalitis (a form of sleeping sickness) in Minneapolis from 1919 to 1926, inclusive, during the progress of the vaccination campaign and in the two years directly following, which was an encephalitis death record for Minneapolis never before known, and there were many additional deaths from infantile paralysis. High medical authorities now frankly acknowledge that vaccination can and does produce encephalitis, and concede that it may cause infantile paralysis.

"Can anyone doubt in the face of this evidence that there are the best of reasons to believe that vaccination actually causes smallpox instead of preventing smallpox, and that vaccination breeds other diseases, and yet, in spite of a constantly increasing mass of such evidence, this dangerous process is systematically urged upon the public.

"Published by The Health Bureau, 400 Plymouth Building, Minneapolis, Minnesota.

"Note: All figures quoted were taken from the records of the Minneapolis Health Department.

"Additional copies of this number can be had for 5c each, 10 for 25c, 100 for $1.00, 1,000 for $5.00."

Let us proceed in an orderly and chronological manner to examine the statements made in the quoted article.

One of the first statements made is that vaccination was compulsory until 1903. In a sense it was compulsory but the law was not very explicit as to when such vaccination had to be done. The law was approved March 3, 1883. As found on page 1865 under chapter 101, Title 3, of the Statutes of Minnesota for 1894, the law reads:

"That every person, being the parent or guardian, or having the care, custody, or control, of any minor or other person, shall, to the extent of any means, power, or authority of said parent, guardian, or other person, that could properly be used or exerted for such purpose, cause and procure such minor or person under control to be so promptly, frequently, and effectively vaccinated that such minor or individual should not take or be liable to take, the smallpox."

It is here submitted that the law is so worded as to be without teeth. The law did not cause vaccination to be compulsory over the state, but did act as a precedent upheld by the courts, allowing cities to pass an ordinance requiring that children must be vaccinated before being allowed to go to school. Few cities had such an ordinance and even in the cities where such a law existed, not all children were vaccinated before coming to school. Loopholes were left for "conscientious objectors." On April 20, 1903, an "act to prevent compulsory vaccination and to prevent vaccination being made a condition precedent to school attendance" was approved by the 33rd Session of our State Legislature. So at present we cannot compel a child to be vaccinated as a requisite for school except during epidemics.

The next statement of importance is that ten people died in 1900 of smallpox during a time when compulsory vaccination was in effect. Unfortunately, the records to 1901 are not now available to check up on the vaccination status of these ten, but they were probably all unvaccinated. But the records were available from 1901 to the present so Table I was carefully compiled and accurately secured from the Minneapolis Health Department records.

Table I shows that every single one of the ten that died in 1903 had never been vaccinated, and only one of the seventeen who died in 1904 had been vaccinated! And that one was a man thirty-seven years old who had been vaccinated once in early childhood. Hence the implication that because these deaths occurred right after a period of "compulsory" vaccination all of the deaths occurred in recently vaccinated people is absolutely false. Nearly all were not vaccinated! Not one was vaccinated in the true sense of the word, for, to be really vaccinated, one must have been vaccinated or revaccinated within the last seven years.

The next paragraph mentions the number of deaths from smallpox from 1905 to 1918 inclusive. During this period there were eleven deaths and only one of these in one who had been vaccinated, and she was a sixty-four year old woman who had been vaccinated in childhood! The writer of the quoted article did not know that, of course. He says nothing of the number of cases, giving only the number of deaths. Table I plainly shows that the incidence of small-

pox was steadily increasing up to 1920, when there was a big epidemic of a mild type. As people became more lax in becoming vaccinated, the amount of smallpox increased. The smallpox was very mild and frightened no one into becoming vaccinated, so a fertile field for the virulent smallpox epidemic of 1924-25 was cultivated.

Table I shows that in the years from 1901 through 1909 there were 2,382 reported cases of smallpox and of these 2,177 had not been vaccinated, making a percentage of 91.4 of unvaccinated cases. During the next decade, 1910 through 1919, 92.2 per cent of the cases were in those who had never been vaccinated. The records show that nearly every one of those vaccinated had been vaccinated in "childhood" or "years ago." From 1901 through 1931, excluding the virulent epidemic of 1924-25, there were 11,722 cases and of these 10,599 had never been vaccinated, or a percentage of 90.4. When the virulent epidemic of 1924-25 is included, there were 13,130 cases altogether and of these 11,683 (88.1 per cent) had not been vaccinated.

During the last thirty years, 88.1 per cent of all the cases of smallpox in Minneapolis were in the unvaccinated. Most of the 11.9 per cent "vaccinated" had been vaccinated in childhood. Table I gives the number of cases each year who were in Status A (vaccinated within seven years), a total of 259 cases. There having been 1,447 "vaccinated" cases and only 259 of these within seven years of contracting the disease, only 17.7 per cent of the above 11.9 per cent were vaccinated in the true sense of the word. When the total number of cases for the thirty years,

TABLE I. SMALLPOX IN MINNEAPOLIS AND MINNESOTA

Year	Total Cases in Mpls.	No. Cases Never Vaccinated	Per cent Cases Never Vaccinated	No. Cases in Status "A"	Total Deaths in Mpls.	No. Deaths Never Vaccinated	Per cent of Deaths Never Vaccinated	Total Cases in Minn.	Total Deaths in Minn.
1901	361	357	98.9	0	1	1	100.0	8485	43
1902	338	318	94.1	1	0			8666	29
1903	184	159	86.3	1	10	10	100.0	4502	55
1904	188	148	79.3	2	17	16	93.8	1920	35
1905	77	67	83.3	0	1	1	100.0	2097	9
1906	85	79	92.9	2	0			1920	6
1907	484	453	93.6	2	2	2	100.0	2787	10
1908	499	480	96.2	2	1	1	100.0	6215	31
1909	166	166	100.0	0	0			1238	17
1910	410	406	99.9	0	1	1	100.0	1262	7
1911	232	223	96.1	0	1	1	100.0	1492	7
1912	424	418	98.3	1	0			2256	4
1913	253	242	95.6	1	0			2858	7
1914	159	147	91.8	0	0			1847	7
1915	175	157	90.0	0	0			1708	6
1916	155	137	88.4	0	0			1256	1
1917	1059	945	89.1	6	2	2	100.0	2827	20
1918	523	467	89.3	3	3	2	66.6	2285	7
1919	560	502	89.6	5	2	2	100.0	2448	9
1920	2177	2028	93.1	76	0			6333	15
1921	2675	2231	83.4	138	3	3	100.0	9375	25
1922	268	237	88.4	2	1	0	0.0	2270	9
1923	191	164	86.8	3	0			1950	2
1924	992	796	80.3	9	221	188	85.1	3125	307
1925	416	283	68.0	5	144	104	72.2	916	197
1926	3	3	100.0	0	0			281	0
1927	12	12	100.0	0	0			126	0
1928	18	14	70.8	0	0			130	0
1929	4	4	100.0	0	0			221	0
1930	8	7	85.2	0	0			332	0
1931	34	28	82.4	0	1	1	100.0	305	2

13,130, is considered, with 259 cases in status A, we see that but 1.97 per cent of all the cases were really vaccinated!

If we look at the columns for deaths from smallpox in Minneapolis, we see a great preponderance of "100 per cent," indicating that all that year who died had never been vaccinated. From 1901 through 1931, excepting the epidemic years of 1924-25, there were 46 deaths, of which number 43 had never been vaccinated. This means that 93.5 per cent of the deaths occurred in people who had never been vaccinated! If we include in this period the epidemic of 1924-25, the total deaths were 411, of which 335 were not vaccinated, so that 81.5 per cent of all the deaths that have occurred during the last thirty years have been in the unvaccinated! As we shall see when examining the epidemic of 1924-25 more closely, all of the people who died and had been "vaccinated" had been vaccinated in childhood. *Not once during the entire recorded smallpox history of Minneapolis has a person died who had been vaccinated within seven years.*

During the entire recorded smallpox history only 2 per cent of all the cases occurred in those who had been correctly vaccinated and not one of these died. Does this mean that vaccination protects one against smallpox? It most certainly does.

From 1901 through 1931, excepting the years 1924-25, there were 11,722 cases with forty-six deaths, which makes a case fatality rate of 0.392 per cent. This shows how mild the mild type of smallpox is. In fact it is so mild at times that anti-vaccinationists say that chickenpox causes more deaths than smallpox and that we are inconsistent in concentrating on vaccination for the more mild disease, smallpox. But these mild types known as "Cuban Itch," "Philippine Itch," and "Alastrim" may become virulent at any time. If the mildness of present smallpox lulls us into a belief in the insignificance of smallpox so that we choose not to vaccinate, we shall be caught unprotected when a virulent epidemic comes along. Witness the virulent epidemic of 1924-25 with a case mortality rate of 25.9 per cent. If in the period from 1901 through 1931 we also include the 1924-25 epidemic, we find that there were 13,130 cases with 411 deaths, making a case mortality rate of 3.130 per cent. One never knows when smallpox will become virulent.

The "Health Protector" says an intensive general vaccination campaign was started in Minneapolis in 1919 and was kept up year after year until 1923. This is a falsehood. There was no special campaign other than the usual and continuous publicity given by all health departments for vaccination. Nor did Minneapolis claim to be one of the best vaccinated cities in the whole world. How could it be with a law forbidding compulsory vaccination?

The article says that the severe epidemic of 1924-25, with six times as many deaths as the whole previous period from 1900, came directly after the most thorough vaccination and revaccination campaign ever conducted by any city in the whole world. The words "most thorough" and "any city in the whole world" are, because of their superlative degree of comparison, earmarks of a quack and acmes of falsehood. There was no such vaccination campaign. The article implies that those who contracted the disease and those who died had been exceptionally well vaccinated. The fact is, as we shall soon see, that nearly all who contracted the disease and nearly all who died had *never* been vaccinated.

In the fall of 1919 and through 1920 and 1921 a numerically great epidemic of smallpox raged. But the disease was so mild that it did not scare people into becoming vaccinated.

Then in the summer of 1924 the storm broke. Virulent hemorrhagic smallpox in its worst form broke out in Minneapolis as a part of a concomitant state epidemic. Doctors and nurses of the health department worked all day and far into the night to quarantine and to vaccinate people. They could smell the smallpox cases as they came to the doors, and they carried this odor in their memories all day. People seemed to die like flies. Hemorrhagic and confluent smallpox was the most common type, although there were many mild cases.

Anti-vaccination cranks pestered the City Health Department, the Board of Education, and the City Council to stop all our propaganda for vaccination. It was after the epidemic started, and not before, that a real intensive vaccination campaign was followed. By coöperation of the Salvation Army and City Mission officials, the employers, and the Press of the city, the idea of vaccination was put across. By means of the vaccination campaign the epidemic quickly came to an end in 1925. Most of those who contracted the disease during the epidemic were people with

a small private business or who did not work for a large company. All the large stores and companies in the city would not allow anyone to work for them who had not been recently vaccinated.

One of the first deaths was that of a chiropractor. He had a large poster on his office door showing a big swollen arm with an ulcer which he said was due to vaccination, and advised one not to be vaccinated. This chiropractor gave several spinal adjustments to a man with backache and malaise. A brother of the patient later called a regular physician because he wasn't satisfied with the progress of the patient. The physician diagnosed the case and found it to be one of the severest cases of hemorrhagic smallpox that he had ever seen. The physician, who had his office in the same building as the chiropractor, hurried to the latter's office and told him that the case was smallpox and advised the chiropractor to become vaccinated. The chiropractor refused; he didn't believe in vaccination. Again the doctor saw the chiropractor but the latter continued to refuse to be vaccinated. About two weeks after his exposure to the patient, the chiropractor developed hemorrhagic smallpox and shortly thereafter died. As soon as the chiropractor became sick, his family was vaccinated at his request and the members of his family did not contract smallpox. This incident is authentic and the records can be found in the Health Department. The chiropractor would not have died had he been properly vaccinated. There was not a single case of smallpox, and, consequently, not a single death, among the physicians in the city, who were, of course, all well vaccinated.

TABLE II. SMALLPOX EPIDEMIC OF 1924 AND 1925 IN MINNEAPOLIS

Age in Years	Number of Cases In 1924	In 1925	Total for Two Years	Percentage of All Cases in Group	Case Mortality Rate	Percentage of All Deaths
STATUS "A" (VACCINATED LESS THAN SEVEN YEARS BEFORE)						
Under 1	0	0				
1 to 4	1	0				
5 to 19	5	0				
20 and up	3	5				
Total	9	5	14	1.0		
DEATHS	0	0	0		0.0	0.0
STATUS "B" (VACCINATED MORE THAN SEVEN YEARS BEFORE)						
7 to 19	5	1				
20 and up	182	127				
Total	187	128	315	22.0		
DEATHS	33	40	73		5.20	20.0
STATUS "C" (NEVER SUCCESSFULLY VACCINATED)						
Under 1	26	15				
1 to 4	59	41				
5 to 19	208	60				
20 and up	427	165				
Total	720	281	1001	71.5		
DEATHS	186	102	288		20.5	78.9
STATUS "D" (UNABLE TO GIVE HISTORY OF VACCINATION AND HAVING NO SCAR)						
Under 1	3	0				
1 to 4	7	0				
5 to 19	28	0				
20 and up	38	0				
Total	76	2	78	5.5		
DEATHS	2	2	4		0.28	1.1

For two years: 1,408 cases, 365 deaths, making a case mortality of 25.9 per cent.

"Percentage of all cases in group" obtained by dividing number of cases in that status by 1,408, the total number of cases in the epidemic, and multiplying by 100.

"Case mortality rate" obtained by dividing the number of deaths in that status by 1,408, the total number of cases, and then multiplying by 100.

"Percentage of all deaths" obtained by dividing the number of deaths in that status by 365, the total number of deaths, and multiplying by 100.

During the year or more of actual epidemic, there were 1,408 cases with 365 deaths, making a case mortality rate of 25.9 per cent. One out of four that contracted the disease died!

The Minneapolis Tribune of January 14, 1925, says in part in an editorial: "Dr. C. C. Pierce, senior surgeon of the U. S. P. H. S., has made it plain where the responsibility for the continuance

of smallpox cases lies—among the 28,000 unvaccinated persons in the Twin Cities and the transients. The disease has been fearfully virulent and this has given a numerically small epidemic a ghastly significance."

During twelve or so months of actual epidemic the city spent $26,870, of which $18,270 was for vaccination tubes, and the remainder for car-running expenses, placards, salaries, etc. This means that about $2,280 was spent per month to fight smallpox. How needlessly expensive all this is! An ounce of prevention is certainly worth more than a pound of cure.

Let us now examine Table II. We see that only fourteen cases occurred among those who had been vaccinated within seven years. This was only 1 per cent of all the cases, and not a single one of these died.

It is seen from the table that in 22 per cent of all the Status B cases vaccination had been performed more than seven years before the disease was contracted. Actual check on the length of time of previous vaccination showed that the mean average of vaccination was 45 years before contraction of the disease. In the seventy-three deaths in this group vaccination had been performed many years before as shown in Table III.

TABLE III

No. of Cases	Years Since Vaccination
3	8 and 10
9	10 and 20
14	20 and 30
10	30 and 40
12	40 and 50
14	50 and 60
5	60 and 70

Five could give no definite data. One had smallpox fourteen years previous.

This means that the vaccination of those that died had occurred a mean average of forty years before. Had these people been properly revaccinated every seven years, they would not have died. Since the case mortality rate of these previously vaccinated cases was 5.2 per cent as compared to a case mortality rate of 20.5 per cent among the non-vaccinated, a person who had been vaccinated as long as forty or fifty years before had four times a better chance of living than one who had never been vaccinated at all.

Table II further shows that in 71.1 per cent of all the cases and 78.9 per cent of all the deaths vaccination had never been performed. Adding to these cases those in Status D (no scar and no history of vaccination) who were presumably not vaccinated, we see that three-fourths of all the cases of smallpox and four-fifths of all the deaths from smallpox in Minneapolis during the epidemic of 1924-25 were in those never vaccinated.

It is evident, therefore, that the smallpox cases were not among the vaccinated and the epidemic was not due to vaccination, as the writer of the "Health Protector" implied. In fact, we must draw the conclusion that the epidemic would have been much greater in size and severity had there not been as many people vaccinated in the city as there were. There were 173 cases among school children, this being 12.2 per cent of all cases in the epidemic. Examination of the vaccination status of these 173 children showed that 97.1 per cent had never been vaccinated or could give no history of vaccination. This certainly tells us that the school child, and preferably the preschool child, should be protected by vaccination. However, smallpox prevailed at the rate of 3.7 per 1,000 among the general population exclusive of the school children, and only at a rate of 1.6 per 1,000 among the school children, which latter group was one-fifth of the general population. The case death rate was 30 per cent in the adult population and only 1.79 per cent in the school-child group during the school year from September, 1924, to June, 1925, as records from the Hygiene Department of the Board of Education show. At that time the figures favored the unvaccinated child as compared to the unvaccinated adult.

The State Board of Health's pamphlet, "Minnesota's Experience with Smallpox," shows a parallel history. During the ten years previous to the outbreak of the 1924-25 epidemic, from 1913 through 1923, there were 35,152 cases and 108 deaths. In Status A (vaccinated within seven years) there were 586 cases with *no deaths*, making 1.7 per cent of all cases. In Status B (vaccinated over seven years before) there were 1,458 cases, making 4.1 per cent of all cases, with but one death. In Status C (never successfully vaccinated) and Status D (no history of vaccination and no scar found) there were 33,108 cases, making 94.2 per cent of all cases with 107 deaths. Practically 95 per cent

of all the cases and 100 per cent of all the deaths were in people who had never been vaccinated!

During the malignant epidemic from January 1, 1924, to August, 1925, the State Board of Health says there were 4,041 cases with 504 deaths in the State of Minnesota. There were 72 cases or 1.78 per cent of all cases in Status A, 527 cases or 13.04 per cent of all cases in Status B, 3,025 cases or 74.86 per cent in Status C, and 417 cases or 10.32 per cent of all cases in Status D. Therefore, 85.18 per cent (Status C and D) of all cases were unvaccinated. The percentage of unvaccinated in the state was similar, therefore, to the percentage in the city. In the group of 504 fatal cases, one death, or 0.20 per cent of all cases, was in Status A, and this death was in a fourteen year old boy with Hodgkin's disease who had previously been given but one year to live. In Status B there were 88 deaths or 17.46 per cent of all deaths; in Status C there were 391 deaths or 77.58 per cent of all deaths, and in Status D there were 24 deaths or 4.76 per cent of all deaths. The distribution of deaths as to vaccination status in the State also agrees closely with that in the city. It is noticed that more than three-fourths of all the deaths were in the unvaccinated, and there were no deaths from smallpox in anyone vaccinated within seven years (if the anti-vaccinationists will allow us to discount the Hodgkin's Disease case).

In the entire State of Minnesota from 1901 through 1931, not including the epidemic of 1924-25, it is found from Table I that there were 79,387 cases with 363 deaths, making a case mortality rate of 0.457 per cent. It will be remembered that the Minneapolis rate for this chiefly mild type of smallpox was 0.392 per cent, a close agreement. When the epidemic of 1924-25 is included in the above period it is found that there were 83,428 cases with 867 deaths, which makes a case mortality rate of 1.03 per cent for the State. The case mortality rate for Minneapolis during this entire period was 3.130, the greater rate being due to the fact that during the epidemic of 1924-25 Minneapolis had 1,408, or 34.6 per cent, of the total of 4,041 cases in the entire state, and 365, or 72.2 per cent, of the total of 504 deaths in the state.

Our examination of the "Health Protector" now brings us to the statement that over 100 persons died in Minneapolis of encephalitis (a form of sleeping sickness) in 1919 to 1926 during the progress of an intensive vaccination campaign, and the implication that these were caused by the vaccinations. As has been said, there was no such intensive vaccination campaign. It is noticed that he speaks of encephalitis as "sleeping sickness" and, therefore, he no doubt has reference to "encephalitis lethargica," which is ordinarily known as "sleeping sickness." Any quotation of lethargic encephalitis figures to mean post-vaccination encephalitis would certainly be erroneous because the two conditions are not the same. He would have to prove that the persons who died of encephalitis lethargica had been vaccinated ten or fourteen days before death to allow him to substitute the words "post-vaccination" for "lethargica." Since the writer of that article could not have been allowed to look over death certificates, which are entirely private and confidential, he could not, of course, look up these cases. But, since the writer of *this* paper comes in daily contact with these records, he looked up the 100 sleeping sickness deaths. It was then found that there was not a single death from encephalitis lethargica (sleeping sickness) from 1919 to 1925 because the classification encephalitis lethargica was not used as a cause of death until 1925. In 1925 and 1926 there were nine cases each year. It is therefore seen that the writer of the "Health Protector" has not taken the figures for "sleeping sicknsss" from the records of the Minneapolis Health Department, as he says, but has deliberately created his own figures from his fertile imagination, and has purposely falsified the whole situation!

In all fairness it must be added that there were 67 cases of encephalitis (but not the sleeping sickness variety) during the years 1919 through 1926. Because the word "encephalitis" literally means "inflammation of the brain," a variety of brain lesions are classified under this heading. There were eight deaths under encephalitis in 1919 and 1920. In order they read as follows:

(1) "Abscess of the brain, left occipital lobe, with Terminal Meningitis, (2) "Abscess of brain with Chronic Endocarditis," (3) "Acute Encephalitis following a Fall," (4) "Cerebritis and Nerve Exhaustion," (5) "Acute Encephalitis, non-epidemic, cause unknown," (6) "Epidemic Encephalitis, contributory cause being Facial

Erysipelas," (7) "Abscess in right lobe of brain," and (8) "Encephalitis—probably Lethargus."

It was therefore evident that these cases were in no way similar to post-vaccination encephalitis and there was no use in tracing relatives to obtain a history of vaccination. We must conclude from our investigation that the "Health Protector" is entirely mistaken when it says that 100 cases of encephalitis were caused by vaccination.

At the end of the article it is noticed that each copy of the article is sold for 5 cents, 10 copies for 25 cents, etc. It would appear that all this anti-vaccination propaganda is in reality a genteel form of "racket." It is a way of making an easy living off the gullibility of the uneducated. Another anti-vaccination publication, put out by the Citizens Medical Reference Bureau, Inc., 1860 Broadway, Room 1606, N. Y. C., ends with "additional copies 5 cents each, $3.00 per hundred," and then, "Friends of the Bureau will be interested to know that it is an incorporated society and is, therefore, legally qualified to hold real and personal property and to receive bequests by will or otherwise directed to the corporation."

So much for the "Health Protector" and all anti-vaccination propaganda!

During the epidemic of 1924-25 a great number of people were frightened and they were therefore vaccinated. This saved their lives. If we look at Table I we see that after that epidemic there has been very little smallpox. Practically all cases since that epidemic have been in those never vaccinated. It is also seen that in the five years, 1926 through 1930, there has not been a single death in the entire state of Minnesota, an occurrence unprecedented in previous years. This leads to an assumption that a very large percentage of people living at that time were vaccinated, but this assumption is modified somewhat by the fact that the type of smallpox since the epidemic has been very mild in character. It is now, however, time for these people to be revaccinated. But the children who are now growing up are not being vaccinated, as will be soon shown. If this continues, we can expect a severe epidemic among the children at any time.

Under Spanish control of the Philippines and for a few years after American occupation of the Islands, more than 40,000 Filipinos died each year from smallpox. Local laboratories were created for making vaccine and finally the civil population became vaccinated. The deaths from smallpox in the native villages close to Manila were reduced from 6,000 yearly to zero while in Manila itself there was not a single death from smallpox for the seven years prior to 1914.

As the result of a general relaxation on the part of subordinate Filipino Health Officers, who were supposed to see that vaccination took place, a large unprotected population, chiefly young children, came into being after 1914. It had been a long time since anyone had seen a case of smallpox so every one felt secure. The result was that in 1918 and 1919 the Islands were visited by the most severe epidemic of modern times. Between sixty and a hundred thousand persons died of smallpox in this period, and more than 90 per cent of the reported deaths occurred in unvaccinated children.

Today we, also, have a false feeling of security. Table IV compiled from vaccination status surveys of the Minneapolis Public Schools is an accurate summary of conditions in the schools as far as vaccination is concerned. These surveys were made by the Hygiene Department of the Board of Education. It will be seen that 36.9 per cent of all the school children were not protected by vaccination or previous attack of smallpox in June, 1923. Conditions were ripe for an epidemic of smallpox. During 1924 and 1925 the epidemic raged, so a vaccination status survey was not done then, but in June, 1925, at the close of the epidemic, only 7.5 per cent of the children were not protected. Since that time the percentage of unvaccinated children has been steadily increasing so that in 1931 about 27 per cent and now in 1932 about 31 per cent of all public school children are unprotected. This condition is paralleled in the parochial schools, 26.2 per cent being unprotected. The table further shows that the percentage of risks has been increasing mostly in the elementary grades, for in the public schools 43 per cent, and in the parochial schools 37 per cent, of the children in the elementary grades are unprotected. Over one-fifth of the population of Minneapolis is school children, and one-third of this group is not vaccinated! Conditions are certainly ripe for a smallpox epidemic among the children. The fact that the younger children are not being vacci-

nated indicates the presence of a general indifference on the part of parents toward vaccination. Surveys show that over 95 per cent of Minneapolis children in the kindergartens are not vaccinated.

The people now know very little of the horrors of smallpox, and have forgotten the cruel lessons of their forefathers. In consequence, the United States has the honor of being third from the top in the yearly number of smallpox cases, being next to the backward countries of India and Older Russia. In the period 1919 through 1924 the United States had 370,000 cases of smallpox, which is five times as much as Norway, Sweden, Denmark, Belgium, Austria, France, Germany, England, Czecho-Slovakia, and Italy combined. It has well been said that these are statistics of which every moron in our country ought indeed to be proud. The Scandinavian countries have the least smallpox because they have compulsory vaccination.

In the American Journal of Public Health (Vol. 2, 1921), Dr. J. N. Foce showed that in California, a state generally known as a haven for anti-medical cults and faddists, the opponents of vaccination have succeeded in developing a school population 80 per cent unprotected against smallpox. This fact is reflected in the number of cases of smallpox. From 1919 through 1924 California had 25,651 cases of smallpox, while during the same period Massachusetts, with a larger population but protected by a well carried-out school vaccination program under that State's compulsory vaccination law (the first one passed in this country), had only 126 cases.

In the August, 1932, number of the same publication, some facts are quoted from the Metropolitan Life Insurance Bulletin (13:4-8, May, 1932). It is stated that the three Pacific Coast States are infested with anti-vaccination cults and are, because of anti-vaccination propaganda, poorly protected against smallpox, while the Atlantic Coast States are well protected in comparison because of vaccination programs. A comparison of these two groups of states showed that in 1931 there were reported three times as many cases of smallpox (3,421) in the Pacific Coast States as there were in the Atlantic Coast States, although the population of the former was only one-sixth of the latter. In fact, the article goes on to say, there were more smallpox cases (1,112) in the single state of Washington, with a population of but 1,589,000, than occurred among the 48,900,000 inhabitants of the whole Atlantic Coast. It is therefore seen that a well carried out program of vaccination definitely prevents smallpox.

Scarcely do we begin to learn a little when Death intervenes before we can profit by experience. Must each of us, including our legislators, live to be a hundred and go through several severe epidemics before we see the necessity of compulsory vaccination? Can we not learn from the past that those who are not vaccinated may die

TABLE IV. VACCINATION STATUS SURVEYS OF MINNEAPOLIS SCHOOLS

PUBLIC SCHOOLS FOR TWELVE YEARS

Type of School	Percentage Risks in 1921	1922	1923	1924	1925	1926	1927	1928	1929	1930	1931	1932	Total No. of Students in 1932
Elementary	37.4	38.1	37.9	39.7		11.0	11.62	11.64	14.23	21.36	35.0	43.0	48,459
Junior High			32.1	29.5		15.1	5.50	5.85	6.53	7.18	11.0	10.0	11,958
Jr.-Sr. High	23.9	27.8	26.3	26.6		18.0	7.87	6.48	6.94	6.78	11.0	10.0	3,790
Senior High	36.0	37.5	38.9	31.5		16.6	3.30	5.66	6.33	6.54	10.0	9.0	12,030
Vocational										6.31	15.0	10.0	1,324
TOTAL IN ALL PUBLIC SCHOOLS	36.6	37.2	36.9	37.0	7.5(?)	14.0	10.18	7.39	11.78	13.12	27.0	31.0	77,561
Highest Risk in Any School	48.6	60.0	71.0	77.7		43.0	39.0	27.92	38.88	99.5	78.0	87.0	
Lowest Risk in Any School	15.8	14.1	29.0	11.7		0.0	1.42	1.32	3.47	0.39	2.0	6.0	

PAROCHIAL SCHOOLS FOR 1932

Kindergarten through Grade 4	50.2	4,338
Grade 5 through Grade 8	23.3	3,952
Total Elementary Grades	37.47	8,340
High School	14.7	144
TOTAL IN PAROCHIAL SCHOOLS	26.2	8,484
TOTAL IN ALL MINNEAPOLIS SCHOOLS IN 1932	30.0	86,045

from smallpox while those who are properly vaccinated will not die? Why do we have this easily eradicated disease among us? It is certain that future generations will not countenance the presence of smallpox in their communities. We have the knowledge and power to forever wipe out this disease. What are we afraid of? Let us consider the matter seriously and then assist the general public to draw up an act and have it passed to the effect that every child must be vaccinated before he or she can attend school. About fifteen of our states have such statutes. And while we are about it, let us include vaccination against diphtheria.

We must come to the conclusion that voluntary vaccination is a failure. As a remedy, vaccination and revaccination should be compulsory in all states. Let us draft a model law, and, when the time seems best, go to our Legislature and urge that compulsory vaccination be adopted by law.

We have here seen that the history of smallpox in the city of Minneapolis has been parallel with that in the entire State of Minnesota. It is reasonable, therefore, that under the same Anti-Vaccination Law now in force, the State has a similar percentage of unvaccinated children to the percentage in Minneapolis. If it is true that one-third of all the school children and also a large unknown fraction of the adults in the State are not vaccinated, it is easy to see that an epidemic of smallpox once started would sweep over the State like wild-fire. This is indeed a serious situation, which we must soon remedy.

Until we obtain a compulsory vaccination law in Minnesota, we must do the best we can without it. The investigation here presented makes it plain to us that what we now need is a State-wide vaccination status survey of all school children, followed by an intensive State-wide vaccination campaign. This would not be hard to do. The State Department of Education and the State Board of Health could together do this very easily on a small amount of money appropriated for this purpose by the State Legislature.

By gradually educating the people to the value of vaccination, the time will come when compulsory vaccination will be demanded by the general public itself. Until that time, since we are all public health officers, be we physicians, legislators, or private citizens, each one of us should urge every child and adult with whom we come in contact to be promptly vaccinated and revaccinated as a protection against smallpox and against diphtheria. May it be said of our generation that although we were surrounded by false prophets and misguided propaganda we were yet able to see our way clear to protect that vast body of people which is not yet born. These future people will soon be among us. They have a right to live. Each one of us should be so well protected that we can not hand on to them when they are born any of the diseases that are preventable by vaccination.

FACTORS OF SAFETY IN EMERGENCY ABDOMINAL SURGERY*

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PERHAPS first among the factors of safety in acute abdominal surgery should be mentioned the treatment of shock. This was revised and advanced more during the World War than at any other period in medical history. The researches of Bayliss and others proved to be a great advance in treating wound shock and preparing wounded men for operation. Bayliss introduced 6 per cent solution of acacia, which has the same viscosity as whole blood and the same osmotic pressure, due to colloids, as plasma, as a substitute for whole blood in maintaining blood volume. In shock, with or without hemorrhage, there is reduction in blood volume, which is more severe when hemorrhage is present. Recently, Walker and Keith demonstrated that in the experimental animal whose blood volume had been reduced by repeated hemorrhages, it was fatal to restore it by infusions of saline or dextrose solution, but when 6 per cent solution of acacia was substituted, blood volume was restored and the

*From the Division of Surgery, The Mayo Clinic, Rochester, Minnesota. Read before the Section of Surgery of the Minnesota State Medical Association, Minneapolis, Minnesota, May 23 to 25, 1932.

animals remained well. The same situation can be remedied clinically by transfusion either of whole or of citrated blood, but it is not always easy or convenient to perform emergency transfusion. According to Keith, clinical observation and physiologic studies, made in the course of the World War, proved that in cases of profound shock, with or without hemorrhage, there was partial suspension of the circulation, associated with actual decrease in the volume of circulating blood, and that the diminished volume of blood bore definite relationship to the severity of the patient's condition, but not to the actual amount of blood lost by hemorrhage. In other words, marked drop in plasma volume occurs in cases of severe traumatic shock, and unless this volume is restored by blood or acacia, death ensues in a great many cases. Patients with traumatic shock, who ultimately recover without intravenous medication, but who have been given the benefit of supportive measures such as external heat, shock enemas, and intramuscular stimulation, demonstrate gradual restoration of blood volume and plasma volume. It can be definitely stated that in cases of shock in which there is no increase in volume of plasma, recovery does not take place. This evidence is sufficient to emphasize the importance of aiding early restoration of plasma in every possible manner. Solution of acacia satisfies all requirements for restoration of blood volume and equilibrium between the fluids of the blood vessels and the tissues, but the manner in which it is done is not definitely understood. The advantages of acacia are as follows: it can be used in place of blood in cases in which blood volume has decreased from shock or hemorrhage, or both, to not more than 50 per cent of the total amount of blood in the body; it can be prepared and kept as a stock solution; it is more economical than blood transfusion and frequently is a life saving procedure in emergencies.

The use of acacia has not received the attention in the small hospitals that it deserves. This no doubt has been due to its supposed toxicity. There have been many unfavorable reactions from its use, as shown by Hanzlik and Karsner, but these were due to impurities, and a pure, nontoxic solution of acacia can be produced. The method of preparation of a pure nontoxic solution as outlined by Osterberg at The Mayo Clinic is the following: The acacia must be in the form of lumps (pearls), number 1, extra quality. A solution of twofold strength is first prepared, and then diluted to the required degree of concentration with freshly distilled water. Eight liters of the solution are prepared in the following manner: after weighing, 480 gm. of acacia and 72 gm. of sodium chloride are placed in a beaker of a capacity of 4 liters, and approximately 500 c.c. of triple-distilled water is added. The acacia is extracted again by heating it on a steam bath and pouring off the supernatant solution. This extraction is repeated until all the acacia is dissolved. It is important to add only a small amount of water at each stage, for the acacia goes into solution more readily when the lumps rub against each other freely and are not caked. The solution is then made up to a total volume of 8 liters, contained in a Pyrex flask of a capacity of 12 liters. This turbid solution, containing some impurities, is sterilized in an autoclave for periods of one hour on four consecutive days. Sterilization results in precipitation of some flocculent material, which is objectionable. Attempts to get rid of this precipitation by filtration and resterilization of the filtrate are of no avail, since each heating results in further precipitation. It is best to siphon off the clear solution that lies above the flocculent precipitate, under sterile conditions, into sterile bottles. These bottles, containing approximately 800 c.c. of the solution of acacia, are stoppered tightly with sterile plugs and gauze. Such a solution appears to be nontoxic, and remains satisfactory for intravenous injection for several months.

Convenient ampules, containing 100 c.c. of a 30 per cent solution of acacia, are now on the market. These require dilution to 500 c.c. with sterile water previous to injection, and have been found satisfactory.

Clinically, Masson, of The Mayo Clinic, in 1928, advised use of acacia, for patients who had lost considerable blood, as a postoperative factor in preventing shock. Figure 1 demonstrates the gradual increase in use of acacia and the gradual decline in use of blood transfusion during 1928 and 1929 at The Mayo Clinic. The results have been so gratifying that the material is now almost indispensable. Hoffman, of The Mayo Foundation, reported a series of 300 cases of various types of shock in which a 6 per cent solution of acacia was injected, with beneficial results in many.

The clinical picture of shock is not infrequently delayed among patients with traumatic conditions such as rupture of the spleen, although signs of internal hemorrhage are obvious, but in such cases, unless measures are taken to prevent it, shock will supervene soon after the abdomen

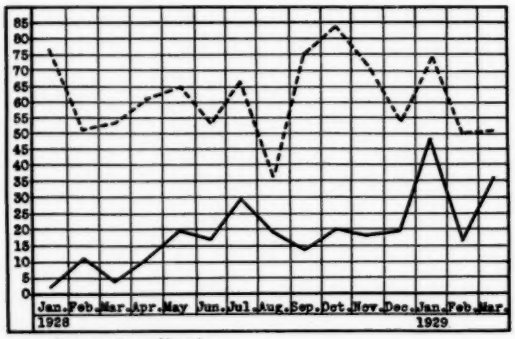

Fig. 1. Increase in use of acacia.

is opened. This is particularly true if complications arise in the course of the operation that may prolong it. The continuous use of acacia, during serious and difficult operations to prevent drop in blood pressure, was shown by Adson and McIndoe in cranial surgery. I have applied this same principle in abdominal surgery with very gratifying results. The following case which I have reported is an example.[8]

Case 1.—A girl, aged six years, was admitted to hospital April 11, 1931, having been knocked down and run over by an automobile. It was said that the wheels passed directly over the abdomen.

Immediate examination disclosed a bruise over the right hip, and the upper left part of the back. The abdomen was diffusely tender, but not rigid. The blood pressure in millimeters of mercury was 100 systolic and 60 diastolic. Roentgenograms of the thorax and pelvis gave negative results. About thirty minutes after admission, the child's general condition changed considerably, and the usual signs of internal hemorrhage appeared. A catheterized specimen of urine contained blood, graded 3. Leukocytes numbered 33,000 in each cubic millimeter of blood. Immediate exploration was advised.

Inspection through a left rectus incision disclosed a large amount of free and clotted blood in the peritoneal cavity. The spleen was in three fragments, from which there was free, active hemorrhage. Splenectomy was performed, and the splenic pedicle was doubly ligated. Gross evidence of injury to the bladder, kidneys, or intestinal tract was not apparent, although the catheterized specimen of urine contained blood. Apparatus for intravenous injection was set up and connected to the left median basilic vein, and 500 c.c. of 6 per cent acacia in solution of sodium chloride was administered during the operation. This was followed by 500 c.c. of citrated bood, given at the conclusion of the operation, to restore the volume of blood cells. At the conclusion of the operation blood pressure was normal, the pulse was of good quality, and the pulse rate was 100 beats each minute.

Injury to the spleen is one of the most severe abdominal injuries and frequently is fatal. Bland-Sutton has pointed out that the patient may collapse as dramatically as when an aortic aneurysm has burst. On the other hand, after the initial injury in the region of the spleen, the patient may gradually fail, with obscure abdominal symptoms, over a period of hours, days, or weeks, until the fact of progressive internal hemorrhage becomes manifest and operation is advised. It is in this latter group of cases, in which the clinical course is more prolonged, that considerable danger to life is present, by virtue of the fact that a fatal secondary hemorrhage from the spleen may occur in from a few hours up to several weeks after the primary injury. Here there is usually a period between the splenic injury and the appearance of signs of internal hemorrhage, which is called the quiescent period or period of symptomatic silence. Usually this period lasts two or three to twenty-four or forty-eight hours. Much more rarely it lasts for days or weeks, and the patient may go about his work in the belief that the primary injury is not of much importance. The silent period here is due to the practical cessation of bleeding from the injured organ. Sudden, profuse, secondary hemorrhage recurs under the stress of some slight rise in blood pressure, and is attended by the same high mortality as primary rupture unless surgery is immediately undertaken. The following case, which was previously reported by McIndoe in a study of all such cases in the literature, is typical.[15]

Case 2.—A man, aged forty-five years, was admitted to the hospital gravely ill, with the following history: ten days previously, while felling trees, he was struck a glancing blow in the left upper quadrant of the abdomen by a branch of a falling tree. He insisted that the blow was of moderate severity, that he was not knocked down, and that no external injury resulted. Almost immediately, however, he experienced a violent pain in the left upper quadrant, which lasted about ten minutes. He was then able to resume work, and continued for the rest of the day. He stated that a slight residuum of pain persisted during the day. That

night it again became severe, and the next day he consulted his physician. By that time the pain had practically disappeared and nothing of note was found on examination.

Accordingly, he worked seven days more felling trees, although he still compained of a continuous, nagging pain in the injured region. On the morning of the ninth day following the original injury he was suddenly seized with a violent exacerbation of the same pain, this time extending through to the back and up to the left shoulder. He became nauseated, but did not vomit. On deep inspiration he had considerable pain at the base of the left lung. Within a short time he collapsed. In the previous nine days he had not noticed fever or any urinary abnormality. His previous history was entirely negative.

On admission to the clinic, on the tenth day after the initial injury, the man was obviously gravely ill, his skin was pale and covered with cold sweat, his eyes were lusterless, and his attention was wandering and difficult to engage. His respiration was rapid, grunting and purely costal in type; his knees were flexed on his abdomen for greater comfort. His pulse rate was 100, his temperature 99.2° F., and his blood pressure 140 systolic and 80 diastolic. His normal blood pressure was 200 systolic. Examination of the thorax disclosed, briefly, elevation of the diaphragm on both sides, particularly the left side, with fluid at the left base and a moderate amount of bronchopneumonia on both sides. There was suspicious tympany in the left side of the thorax which rather suggested the possibility of diaphragmatic hernia. The abdomen was generally rigid and tender, especially in the left upper quadrant. Here an indefinite mass could be felt, that was dull to percussion, from the seventh costal cartilage to the level of the umbilicus. This dulness did not shift. Rectal examination was negative. The urine was negative. The blood findings were those of severe secondary anemia. The concentration of hemoglobin was 48 per cent, erythrocytes numbered 2,720,000 and leukocytes 25,000 in each cubic millimeter of blood; the differential count was normal. The diagnosis was that of concealed abdominal hemorrhage, probably from ruptured spleen, with a further possibility of a diaphragmatic hernia of the left side. After further surgical consultation, it was thought advisable to observe the patient for twelve hours and to combat the severe dehydration from which he was suffering by subcutaneous injection of saline solution. The next day it was obvious that the patient's condition was worse, and immediate operation was advised.

Under local anesthesia supplemented by ethylene the abdomen was opened by a wide transverse incision in the left upper quadrant. Blood was immediately encountered inside the peritoneum. Further exploration revealed a huge hematoma, consisting of old, black clots and recent fresh hemorrhage, extending over the stomach from the transverse colon below to the left dome of the diaphragm above. It probably contained about 2 liters of blood. Next was encountered a piece of spleen about 10 cm. in diameter, attached by a fragment of what was taken to be the remains of the splenic pedicle. There were no blood vessels, however, to be noted in this piece of capsule. The remainder of the spleen, in five separate pieces (Fig. 2), was then found loose in the blood clot and held together by it. The splenic pedicle appeared to be entirely free, but no active hemorrhage was occurring from it. The whole

Fig. 2 (Case 2). Five fragments of spleen.

mass was quickly removed from the abdomen, and three clamps were placed across the splenic pedicle as a protective measure. A few bleeding veins on the greater curvature of the stomach were ligated. The cavity was packed with iodoform gauze and the abdomen was closed. Transfusion of 500 c.c. of citrated blood was given on the table, and immediately the patient was placed in an oxygen tent, where he remained forty-eight hours. The clamps were removed at the end of this time, and the packing in seven days. A rubber tube was then inserted, and was pulled out a little daily, until the cavity was obliterated. Convalescence was uneventful, and the patient was up and about on the sixteenth postoperative day.

There are numerous reports in the literature of the spleen being ruptured by insignificant injuries to the splenic region, and fourteen cases have been reported as occurring from falls out of windows, from ladders, from a balcony, and into cellars or pits. If such injury is suspected, the physician should urgently request that the patient remain in bed ten days to two weeks for daily observation. It is to the local symptoms and signs, however, that the closest attention should be paid, for it is here that the only definite evidence of splenic injury is to be found. Pain over the region of the spleen is almost constant. It varies in intensity from mere discomfort to severe pain of great intensity, requiring the patient to lie down. Rigidity of the abdominal wall

over the splenic region (Fig. 3) is always present, and is diagnostic of peritoneal irritation. Hartmann first established the diagnostic significance of abdominal rigidity, and stated that in the absence of all other symptoms, contraction of the abdominal wall, not limited to the place of

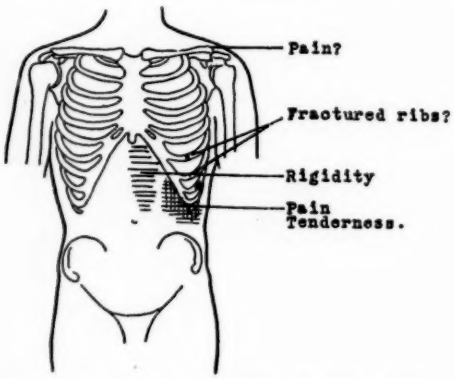

Fig. 3. Local signs and symptoms in splenic injury.

injury, was a clear indication for immediate laparotomy. On the other hand, when it was absent, he refrained from intervention. His contention was strikingly supported by the statistics of Mauclaire and Roger derived from twenty-seven cases of abdominal contusion, in ten of which there was muscular rigidity and in seventeen none. Of the former group of patients nine were operated on, and in each case a ruptured viscus was found. One patient refused operation, and died from peritonitis from a ruptured bowel. All of the latter group of patients recovered without operation. Persistent abdominal rigidity then, in the left upper quadrant of the abdomen after slight injuries in this area, should cause one to suspect underlying splenic injury.

GUNSHOT WOUNDS OF THE ABDOMEN

Since these injuries are becoming more common in civil life, any suggestion regarding surgical treatment that results in lowered mortality is welcomed. These accidents previously occurred mainly in larger cities, but in recent years they have taken place in rural communities, so that it is essential for physicians practicing in these communities to be familiar with such emergencies.

Gunshot wounds of the abdomen obviously should be treated early. Military opinion, as a result of experience in the World War, turned in favor of operative treatment, although previous military experience had seemed to indicate that not to operate was the safer course. However, occasionally a patient with a gunshot injury of the liver, or with a gunshot wound of the pelvis, survives without operation, but as a rule, under present conditions, there is little to be said for expectant treatment. Of three patients seen at The Mayo Clinic, two with injuries to the intestine were submitted to operation and one with injury to the liver was not operated on. All three recovered. Two of these cases have been reported before. Briefly, the findings and surgical procedures were as follows:

Case 3.—A girl, aged eighteen years, was admitted to hospital February 2, 1930, five hours after receiving a gunshot wound in the abdomen. The weapon was a 38-caliber revolver. Immediately after the injury she had walked about 50 yards. Her left leg then had become too weak to bear her weight, and she had crawled for a half mile, dragging the left foot.

The bullet wound was found in the right flank, but the point of exit was not found. The abdomen was diffusely tender and moderately rigid. The left thigh was maintained in flexion, and any movement of it caused pain in the region of the left hip. A roentgenogram disclosed the bullet in the inner aspect of the left thigh, 2.5 cm. below the lesser trochanter. The temperature on admission was 100.4° F.; the pulse rate was 112 beats each minute and the blood pressure was 125 systolic and 75 diastolic.

Operation was performed under ether anesthesia six hours after the injury. For satisfactory exposure, an incision was made in the median line, extending above and to the right of the umbilicus. There were two large holes in the ascending colon, just above the cecum, and thirteen holes of varying sizes throughout the ileum. A hole 2.5 to 3 cm. in diameter was torn in the sigmoid. The abdomen was filled with blood and intestinal content. The patient went into a state of shock, the pulse rate varying around 160, shortly after the operation was begun. This was combated by intravenous injection of 1,000 c.c. of 6 per cent solution of acacia. In view of the fact that there was no destruction of the blood supply in the mesentery to the bowel, it seemed best hurriedly to close the perforations. An enterostomy tube was then placed in the ileum to relieve pressure by gas and protect the suture lines. The hole made by the bullet at exit was found in the left side of the pelvis, just under the round ligament. The bullet could not be palpated through this opening. The peritoneal cavity was washed out repeatedly with warm saline solution, and aqueous solution of mercurochrome was used freely over the perforations. One Penrose cigarette drain was placed along the cecum, and one along the sigmoid for drainage. Tetanus antitoxin, 1,500 units, was given intramuscularly.

The ileostomy tube was removed on the thirteenth day after operation, and the drains were removed on

the thirteenth and fifteenth days. The patient was out of bed on the thirty-seventh day, and left the hospital three days later, with the wound well healed.

Case 4.—A boy, aged thirteen years, was admitted to hospital July 8, 1931, about two hours after receiving a wound from a 22-caliber rifle in the right lower part of the abdomen. The bullet entered just below and to the right of the umbilicus and passed out through the right iliac bone. The patient felt nauseated and faint, and vomited once, but the blood pressure remained normal. The lower part of the abdomen became generally tender and rigid and there was increasing pain in this region. Immediate surgical intervention was advised.

The abdomen was opened through a right rectus incision. A loop of ileum, approximately 30 cm. from the ileocecal valve, was found to have two perforations. These were closed with chromic catgut. There were also three holes in the mesentery, which were similarly closed. No blood vessels of the mesentery were injured. The abdomen was cleansed with saline solution. One Penrose drain was placed so that it extended down to the cecum and the wound was closed. Convalescence was uneventful, and the patient was dismissed from hospital on the twentieth postoperative day.

Case 5.—A man, aged twenty-two years, was admitted to hospital October 25, 1931, forty-five minutes after receiving a gunshot wound from a 22-caliber rifle. While he was getting into a car, the gun accidentally had discharged, the bullet had struck at the right costal margin, and could be palpated just beneath the skin of his back. The point of entrance and the point at which the bullet could be palpated indicated that it had passed through the right lobe of the liver. There was evidence of marked shock, the blood pressure was 90 systolic and 45 diastolic, later dropping to 80 systolic and 25 diastolic. The right side of the diaphragm was elevated, and the abdomen generally was rigid. The thorax was clear.

It was safe to assume, from the direction and course of the bullet, that the intestinal tract had not been injured. The patient was given general measures for shock, without any intravenous medication, because it was essential to keep the blood pressure down for a few hours to a level compatible with life, as an aid to checking of hemorrhage. The injury was in such a situation that surgical intervention aimed at control of bleeding would probably have been futile. The blood pressure gradually returned over a period of three days and all evidence of bleeding ceased. Further convalescence was uneventful (Fig. 4), and the patient left the hospital on the tenth day following admission with the bullet still in his back.

The points to be stressed in Case 3 which undoubtedly were valuable contributing factors in recovery were the use of acacia for shock, enterostomy above the injured part of the intestine, thoroughly washing out the peritoneal cavity with warm saline solution and free use of mercurochrome. The value of acacia has been considered previously, but here again it is profoundly demonstrated.

The value of enterostomy in these cases cannot be overestimated. It should be performed in every instance of extensive traumatic rupture of the intestine, for it is a safety valve for the escape of gas and of the fluid content of the small bowel, which constantly accumulates, and thereby protects the intestinal suture lines. This does not apply to injuries of the duodenum or upper part of the jejunum. From the enteric stoma, in Case 3, 1,600 c.c. drained in the first eighteen hours, and then varying amounts up to 2,000 c.c. each twenty-four hours. The patient defecated normally on the fifth day. The enterostomy tube was removed on the thirteenth day and the wound closed spontaneously soon afterward.

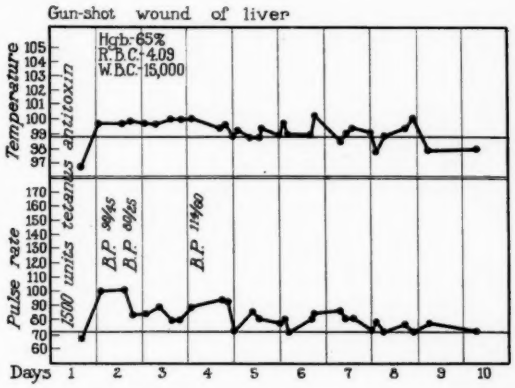

Fig. 4 (Case 5). Convalescence in a case of gunshot wound of the liver.

Thorough washing of the intestines and the peritoneal cavity with warm saline solution following contamination such as occurs in these injuries should be advocated. It is absurd to expect to sterilize the abdominal cavity by any method, but reduction in the amount of intestinal content and of blood in the peritoneal cavity should not be injurious. Metaphen, 1 to 1,000 solution, or a 2 per cent aqueous solution of mercurochrome, may be used freely in the peritoneal cavity. Although I possess no data as to the beneficial results from the use of either, I do gain a sense of security, false or otherwise, by using them. The results in this instance seem to support the belief that the measures may be of benefit.

The judicious use of adjacent omental tags of

fat for protection of the suture line was advocated many years ago by W. J. Mayo. There is no doubt that a small tag of fat, sutured over the line of closure of an opening in the large intestine, has prevented the death of many patients from general peritonitis. The principle is utilized in operations on the renal pelvis, ureter, and biliary tract, in plastic operations on the pyloric end of the stomach and duodenum, and to cover the dangerous angles following resection of the stomach. The value of this phase in technic is not generally recognized.

Case 4 is of interest on account of the lack of shock, which can be attributed to the slight loss of blood and the relatively small amount of visceral trauma and contamination. The value of early surgical intervention is demonstrated.

Case 5, in which operation was not performed, is an example of the value of constant observation of a patient who is in shock from hemorrhage but whose blood pressure should be kept low as an aid to control of internal bleeding that is taking place in a situation that would be most difficult to control surgically. It was planned to give small amounts of 6 per cent solution of acacia intravenously, should the systolic pressure drop below 70. This point is considered the lower limit, if too serious consequences are not to supervene.

Operation in gunshot wounds of the abdomen involving the intestinal tract in which there is considerable soiling and hemorrhage, must be performed with dispatch. The type of operation necessary can be determined only at the time of exploration, and will depend on the nature and amount of trauma. If the blood supply to an intestinal loop has been destroyed, resection is the only choice. If the mesenteric side of the bowel has not been injured, the perforations can be closed without obstructing the lumen of the bowel, as in Cases 3 and 4.

ACUTE INTESTINAL OBSTRUCTION

So much has been written on this subject within the last few years that I hesitate to direct attention to it here. The mortality rate throughout the country is approximately 45 to 65 per cent, however. Therefore, considerable work remains to be done; the public must be taught to seek surgical care earlier, and physicians must keep constantly in mind the factors which have been proved experimentally and clinically to be of distinct benefit in combating this condition. There is no other acute abdominal condition in which recovery depends so completely on early surgical intervention. Perhaps the greatest single step in progress was the discovery that the value for plasma chlorides was reduced, that there was increase in the carbon dioxide combining power of the blood plasma, and that there was retention of the nonprotein nitrogen and urea nitrogen in the blood stream. Haden and Orr, in 1923, reviewed these changes in chemical values of the blood in cases of experimental obstruction, and advised use of sodium chloride solution intravenously in combating the disease. Dixon, in 1923, called attention to the beneficial results from use of sodium chloride in obstruction of the upper part of the intestinal tract, and that preoperative administration of saline and glucose solution made it possible to carry out surgical procedures with minimal risk. Walker and Keith, in their dehydration experiments on animals, pointed out the advisability of restoring fluid to the tissues generally in the form of isotonic solution of sodium chloride or dextrose.

Another progressive step in treating this condition was made by Dragstedt. He isolated a segment of intestine, closed both ends, and reestablished the continuity of the intestinal tract by end-to-end anastomosis. Under these conditions, the blind loop became very markedly distended; if distention increased, the classical symptoms of intestinal obstruction developed, and in addition, alterations in chemical values of the blood were noted. If the content of the closed loop was aspirated, improvement immediately followed, and the chemical values of the blood returned to normal. When saline solution was administered intravenously, also, the animals lived several days, but if treatment was not given they died in twenty-four to forty-eight hours. The inference was that a toxic substance was absorbed from the injured mucous membrane of the closed loop. If this assumption is correct, as it seems to be, then in acute intestinal obstruction there is not only dehydration toxemia from vomiting but also toxemia from absorption of certain unknown substances from the injured bowel. In this connection, Wangensteen and Chunn showed that the substances above and below the obstruction were equally toxic.

Judging from the foregoing evidence, it is clear that the most important factors in the

treatment of acute intestinal obstruction are to combat the dehydration with saline and sugar solutions and to release the obstructed intestinal content. Surgical intervention in these cases, without preoperative preparation with saline and glucose solution, especially if the obstruction has lasted three to four days, as it often does, results in extremely high mortality. When the obstruction is only partial, or of only a few hours' duration, exploration and repair generally can be effected without preoperative preparation.

A Wetzel type of enterostomy is the operation of necessity in cases in which obstruction has lasted forty-eight to seventy-two hours. It should be performed just above the obstruction to secure adequate drainage of the obstructed loop. In the presence of extreme toxemia, it is advisable to follow the suggestion of Wangensteen and Chunn, that the loop of bowel just beyond the obstruction be drained by a second enterostomy. The tubes should be brought out through the omentum, and through stab wounds in the abdominal wall. The omentum practically prohibits any chance of leakage around the tube, and in addition facilitates closure of the opening in the bowel in two to five days when the tube is removed. Further exploration to seek the cause of the obstruction in delayed cases is almost certain to produce general peritonitis and death. It is a bad practice to explore at the expense of the patient's life. It is not uncommon to have the obstruction correct itself following enterostomy. When this does not follow, secondary operations can be postponed until the physiologic balance of the organism has been restored sufficiently.

Gastric lavage immediately before surgical intervention is a valuable adjuvant to a successful issue. Patients have, in fact, been known to drown by vomiting and aspirating a large amount of their gastric content while under either general or spinal anesthesia. It is remarkable how quickly a stomach is filled by means of reverse peristalsis, especially if the patient has been vomiting repeatedly.

Spinal anesthesia is being employed more and more in treatment of acute intestinal obstruction. Frequently it is of distinct advantage, in that the obstruction is occasionally automatically released by contraction of the bowel. It is undoubtedly indicated in all early cases of obstruction, but in those in which it has lasted three to four days, and in which the organism is profoundly disturbed, I feel that spinal anesthesia should be used with reservation. Reaction following its use in such a patient is to be regarded as almost a fatal outcome. It is a much more prudent measure to perform enterostomy under local anesthesia, and if necessary to use a small amount of gas.

SUMMARY

The use of 6 per cent solution of acacia as a substitute for blood transfusion in the treatment of shock in emergency abdominal conditions, such as rupture of the spleen and gunshot wounds of the abdomen, is stressed. It is nontoxic, easily prepared, and can be kept as a stock solution for many months without deteriorating. It rapidly restores and maintains blood volume. If shock is produced by hemorrhage it is almost invariably fatal to restore the blood volume with solutions of saline or sugar. Continuous administration of small amounts of solution of acacia during operation, if shock is anticipated, is a distinct advance in prevention. This is particularly true in cases of delayed rupture of the spleen or in extensive gunshot wounds of the intestines or mesentery.

Patients who sustain injury over the splenic region, although the injury may seem insignificant, should be kept under observation ten to fourteen days. If there is continuous rigidity in this region, and if splenic dulness is progressing, immediate surgical intervention has been shown to be the best course to pursue.

Military opinion, as a result of experience in the World War, turned in favor of operative treatment of gunshot wounds of the abdomen. Closure of the perforations, or resection of the intestine with end-to-end anastomosis, if the blood supply to the intestine has been destroyed, are the operations of choice. If there are multiple perforations, with considerable soiling of the peritoneal cavity, it is advisable to perform enterostomy above the injured portion of the bowel, and to wash out the abdomen with warm saline solution. Metaphen, 1 to 1,000, or a 2 per cent aqueous solution of mercurochrome, may be used to advantage in the peritoneal cavity. In gunshot wounds of the right half or dome of the liver, it may be judicious to postpone surgical intervention, but continuous observation of the patient must be maintained.

In acute intestinal obstruction, the organism is

profoundly disturbed by dehydration toxemia from vomiting, and by toxemia resulting from the absorption of toxic substance from the injured mucosa of the obstructed bowel. Preoperative preparation by intravenous administration of normal saline and glucose solution rapidly restores chemical values of the blood to normal, and renders the patient a much safer operative risk. Early operation is imperative when fluid balance is restored.

Spinal anesthesia is advisable in early cases and may result in spontaneous cure, but if this does not take place, immediate exploration can be done and the obstruction relieved. In delayed cases, enterostomy only is advisable, usually performed under local anesthesia. Further exploration is to be condemned.

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ACUTE CONDITIONS OF THE ABDOMEN*

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ACUTE abdomen, though a meaningless term, has been quite generally adopted to cover a symptom-complex that is more or less common to pathologic conditions suddenly arising within the abdomen. The entities giving rise to these confusing symptoms are, in their probable order of frequency: acute appendicitis, biliary colic, renal colic, intestinal colic, perforated peptic ulcer, intestinal obstruction, acute pelvic inflammation, ruptured ectopic pregnancy, pancreatitis, diverticulitis, mesenteric thrombosis, and torsion of the great omentum. For purposes of differential diagnoses there should be added several conditions not arising in the abdomen. They are pneumonia, pleurisy, tabetic crises, lead colic, and coronary thrombosis.

As pain is the outstanding manifestation in most acute abdominal crises, it is important to remember that pain resulting from a lesion of a viscus is not felt in that viscus itself, but is referred to the peripheral distribution of the spinal nerves arising from those segments of the cord with which that viscus is connected through its sympathetic nerve supply.

Most pain, therefore, that is felt in the early stages of an acute abdominal catastrophe is of this reflex character and is not localized to the situation of the viscus primarily at fault. Later, when the local inflammation has developed sufficiently to irritate the parietal peritoneum, the pain becomes localized at this point.

Burgess places all acute abdominal conditions into four groups: I, Colics; II, Perforations; III, Inflammations; IV, Obstructions.

I. The colics are characterized by: (1) sudden onset of pain; (2) sudden cessation of pain; (3) tendency of the pain to recur. The pain in this group is usually referred to certain characteristic regions. In biliary colic it is felt in the epigastrium, radiating backwards to the angle of the right scapula and occasionally to the tip of the right shoulder. In renal colic the pain is felt, first in the loin, then shoots down to the groin, inner aspect of the thigh and testicle. Of marked diagnostic value in connection with the pain is increased frequency of micturition and blood in the urine. In intestinal colic pain is felt more or less all over the abdomen. Lead colic differs from other intestinal colics in that the pulse during the pain is retarded, and the blue lines in the gums are present. Tenderness of the abdomen is often present in intestinal colic, but in some cases the pain is relieved by pressure. Muscular rigidity may occur in the colics, but seldom is of the unyielding character found in the true involuntary rigidity. The patient is more restless than in other acute abdominal crises.

II. Perforations are characterized by: (1) sudden onset of pain, usually excruciating; (2) the severity of the initial shock; (3) marked involuntary rigidity from the very first; (4) signs at times of free gas in the abdomen.

III. Inflammation. In this group the onset is less sudden than in the conditions already considered, and general symptoms of malaise may precede the crises by a few days. The pain never reaches its greatest intensity in the first few moments. There may be a rise of temperature in the early stage, wherein this group differs from the others mentioned. The presence or absence of rise of temperature should not, however, influence one too much in drawing conclusions and should certainly never be waited for to complete the diagnosis. There is often fairly early local tenderness (sometimes first detected in the rectum as in salpingitis and pelvic appendicitis). Muscular rigidity of the involuntary type, absent at first, appears when the parietal peritoneum becomes affected. Swelling may later appear in the region of the appendix, gallbladder, Fallopian tubes, etc.

IV. Obstructions are characterized chiefly by: (1) the persistence of vomiting; (2) the cessation of the passage of flatus; (3) progressive abdominal distention. Involuntary muscular rigidity is absent and the pain and tenderness are usually distributed more or less over the entire abdomen. As the condition progresses there is extreme distention, fecal vomiting, restlessness,

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pinched expression, rapid and thready pulse with profound collapse.

If the case before us can be placed in one of the above named groups, the problem of diagnosis is at once simplified. When, however, the symptoms are indefinite or overlap as in obstruction, or perforation, developing into peritonitis, the clinical differentiation is more difficult and can be arrived at only by carefully excluding all other conditions for which it might be mistaken.

Confronted with a patient that presents evidence of something having gone seriously wrong in the abdomen, we are obliged to consider the advisability of immediate operation. To settle this question is indeed the most urgent, and often the most perplexing, problem connected with an acute abdominal emergency.

If the all-important question, whether to operate or not, is answered in the affirmative, we find ourselves face to face with another question, namely, what to do with what is found. Even though the case presents a fairly definite picture, it is seldom so clear that one can do better than operate under a doubtful diagnosis. It is evident therefore that one who undertakes acute abdominal surgery must be capable of dealing with any unexpected difficulty that may be encountered.

The time at hand permits such a limited discussion that only a few points on diagnosis, and our own method of treating the more common conditions coming under acute abdominal emergency, will be touched upon.

In a case of appendicitis, where the operation reveals a ruptured appendix with no attempt at walling off, there is at best a potential peritonitis; more likely the peritoneum is already involved to a greater or lesser degree, and needs only the additional provocation produced by manipulation during the appendectomy to hasten it into a spreading and eventually a general peritonitis. We are not in accord with the surgeon who will close the abdomen without drainage in such a case. On the contrary we often take even greater precautions than the drain alone, and do a cecostomy or an appendicostomy. By thus draining the bowel at once, permitting free escape of gas and feces, the danger of ileus, that invariable accompaniment of peritonitis, is to a great extent avoided. It permits also the instillation of fluids into the bowel in any amount that may be desired. In doing an appendicostomy it is well to insert the stem of a Y glass connection into the free end of the enterostomy tube; then longer tubes slipped over the two open ends, one extending down into a receptacle for draining liquid feces, the other hung up on a standard for escape of gas. The omentum should always be brought down around the tube where it enters the bowel, anchoring it there with several sutures. A still better method is to pull the tube through a puncture in the omentum. This will provide protection and facilitate closure when the tube is removed.

We still adhere to the belief that the badly infected cases, particularly of peritonitis, are greatly benefited by pouring ether over the involved parts. While ether is mildly antiseptic, it is not advocated so much for the bactericidal power as for its action in producing or increasing leukocytosis, thereby aiding nature in its defense against infection. In several cases of advanced peritonitis we have literally washed out the abdominal cavity with ether, using a can or more for the purpose. When more than an ounce of ether is used, the overflow collected in the pelvis should be immediately aspirated or gently swabbed out. We have not closed the abdomen without drainage where ether was used.

We believe that operation in acute cholecystitis should be restricted to the case where it seems a life-saving measure. After quite an extensive experience we are convinced that about ninety per cent of patients with acute cholecystitis will, with an ice bag, rest and restricted diet, improve to a point where a cystectomy with other necessary work can be safely done. If progress is unfavorable, then, after proper preparation such as transfusion, glucose or calcium chloride intravenously, the abdomen is opened under local anesthesia. Adhesions are carefully separated, and a gauze pack surrounded by a rubber dam is placed so as to isolate the infected parts. Further procedure is limited to opening the bladder and removing stones when easily possible. Under such treatment we have a right to hope that the patient will survive, always regretting, of course, that another operation will be necessary. However unfortunate this may be, it is better to be safe than sorry.

Perforated peptic ulcer, if seen early, can be recognized by three outstanding and distinct symptoms: (1) excruciating pain; (2) extreme rigidity; (3) disinclination to move or be moved.

In the words of Lord Moynihan, "the patient is struck motionless." He adds, "that when the pulse is examined a great surprise is felt, for it is not increased in frequency nor diminished in volume, the blood pressure is not diminished, and in a few cases that we have examined, the blood volume is unchanged. There is therefore no 'shock.' Great harm has come from the almost invariable use of the word 'shock' to describe the conditions." While Lord Moynihan is correct as regards actual findings, the fact remains that the patient in his extreme agony presents every outward symptom of shock. The picture is not unlike that resulting from a high explosive.

Perforated ulcer demands immediate operation. When possible the operation should be done under local or spinal anesthesia. When the abdomen has been opened, the question arises what next and how much? Here again experience has taught us that the less that is done the better for the patient. Under certain conditions, such as complete obstruction of the pyloric ring, one is justified in closing the ulcer and immediately performing a gastroenterostomy. Since the operation is essentially a life saving one, we feel that, unless more radical procedure is definitely indicated, one should content himself with closure of the rupture, leaving further work, if that should be necessary, to a more favorable time.

For many years we have used a modified Balfour technic in closing the perforation. This consists in burning out the ulcer with the electric cautery, bringing the edges together with through-and-through sutures of forty-day catgut, covering over with a row of Lembert suture, and again plastering this over with a layer of omentum.

Following this procedure we have had only one patient who required a subsequent gastroenterostomy. Another had a second perforation at the same site three months after the first rupture. This case was interesting because the patient, a young lady, at the second attack immediately recognized her condition, ordered a cab and was on the operating table within an hour from the time the perforation took place. After closing the lesion in this case, a gastroenterostomy was immediately done. She has gained twenty pounds, and remained well ever since. In about ninety per cent of our cases, the perforation was in the anterior wall of the duodenum.

In intestinal obstruction, unless the condition is recognized early, we believe that operation should usually be limited to an enterostomy above the obstruction, thus draining the toxic intestinal contents and giving the patient time to recuperate before removal of the obstruction is attempted. At the recent State Meeting, Dr. Counseller stated that the bowel contents both above and below the obstruction are almost equally toxic. Accordingly, it may be advisable to drain both proximal and distal to the obstruction.

Of all the conditions in the category of acute abdominal crises, ruptured ectopic gestation is perhaps the easiest to diagnose. About the only reasonable excuse one can offer for failing to recognize a typical case is that "I never thought of it"; an indictment to which we are often obliged to plead guilty. We are not yet convinced that leaving the blood (auto-transfusion) in the abdomen is of benefit to the patient. The only case of ruptured extra-uterine pregnancy that we have lost was one in which a large amount of blood was allowed to remain. The patient died on the fourth day from no apparent cause. Whether the blood in the abdomen was a contributory cause of her death or not, we don't know.

In operating for intussusception, one should never neglect to provide against recurrence. Our experience has taught us that the best precaution is to bring the terminal ileum up alongside the ascending colon for about three inches, tacking it there with two or three sutures. I do not recall the name of this procedure, nor that of its originator. It was suggested to me by Dr. Birnberg while operating upon one of his patients.

Acute gonorrheal peritonitis is sometimes difficult to differentiate from acute appendicitis. The history is apt to be misleading. A positive smear may not be obtainable, and because of the apparent innocence of the victim, the possibility of Neisserian infection is often overlooked. Pain and tenderness is frequently most marked just below McBurney's point.

It is an accepted fact that acute gonorrheal peritonitis, if unmolested, will pass through a cycle lasting from two to six weeks, leaving, perhaps, a few adhesions or possibly a chronic pyosalpinx, but otherwise ending in complete recovery. If, however, a laparotomy is done during this acute stage, and the abdomen is closed without adequate drainage, there usually develops a

violent general peritonitis which only too often ends in death of the patient. To the inexperienced this may seem a radical statement, but the fact remains that the mixed infection brought about by opening the abdomen at this time is almost sure to prove disastrous. Coffey, recognizing this danger, devised a drain consisting of twenty or thirty gauze wicks laid across the abdomen reaching down into the pelvis. The intestines are shut off by five or six layers of guttapercha tissue. In 1920 the writer presented a paper before the Sioux Valley Medical Society in which was described a vaginal drain that in our hands has been eminently successful in these cases. It consists of a large split rubber tube with two strips of iodoform gauze which is passed from the culdesac through an opening in the posterior vaginal wall. What is meant therefore by adequate drain is not the ordinary tube and cigarette, but one that provides for escape of the infected discharge by gravity, or one that completely isolates the offending parts, at the same time acting as a cofferdam to shut off the intestines. It might be stated that we believe the vaginal drain mentioned, in addition to its use in acute gonorrheal peritonitis, has been a life saver in many cases of peritonitis from appendicitis and other causes. Some years ago I was severely rebuked by a colleague for placing a vaginal drain in a supposed virgin. I replied that if she were a member of my own family I would infinitely rather have her alive with a ruptured hymen than see her in her grave with that vestige intact.

In conclusion let me add that when confronted with an acute abdominal emergency, we must bear in mind that the majority of these cases do not present a primarily acute condition, but the acute termination of a chronic disease.

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ABSCESS OF THE LIVER*

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"For the King of Babylon stood at the parting of the ways, at the head of the two ways to use divination; he made his arrows bright, he consulted with images, he looked in the liver."—Ezekiel, XXI-21.

THE liver has, for ages, been the subject of curiosity. Three thousand years ago the Babylonians constructed clay models of this organ and these are regarded as excellent specimens of anatomic illustration today. In "looking into the liver" the Babylonians were in quest of soothsayer's guidance, whereas, thirty centuries later, we look into the liver in quest of scientific facts.

The present undertaking has for its purposes: (1) to consider a group of fifty hitherto unreported post-mortem liver abscess cases, for critical study; (2) to review some of the customary statements and descriptions of the liver abscess syndrome in the interests of verification or of change; (3) to find, if possible, some aids by which we may conquer this somewhat unusual but very baffling and highly fatal disease which involves the largest of the important organs of the body.

Fortunately the septic liver abscess, as distinguished from the abscess of amebic origin, is not of common occurrence. On consulting the records of some 18,300 autopsies, I found 111 cases of liver abscess, this condition accounting for .06 per cent of deaths from all causes. It is

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moreover somewhat uncommon in the experience of the average surgeon. In this group of cases it occurred three times in one surgeon's experience, twice in the experience of six and but once in the experience of all the others. One writer on this subject, using fourteen cases for his discussion, mentions ten cases of his own. Another writer believed liver abscess to be rare because in his extensive experience he had seen but three cases.

When we stop to consider that the portal system of veins passing into the liver drains the stomach, all the small intestine, the appendix, the cecum, ascending, transverse and most of the descending colon, as well as the spleen and the pancreas and also the cystic vein of the gallbladder, it seems strange indeed that the liver, even though so admirably contrived to strain out or to filter the impurities from the venous blood which comes from so extensive an area, should not more often be overwhelmed in the performance of its duty as scavenger for the intestinal tract. Beaver suggests that protection against infection is to some extent dependent on its abundant blood supply with free movement of blood through the sinusoidal vascular system.

The males predominate in this series over the females thirty-nine to eleven. The youngest patient was a newborn female and the oldest a woman of eighty-two years. An abscess of the liver holds its threat chiefly for persons in adult life, only seven cases occurring under the age of twenty. In going over the various histories it appears that thirty-two of the fifty patients (64 per cent) were chronic sufferers from a variety of complaints over periods ranging from four weeks to seven years. Only twenty-six per cent were such as to fall into a strictly acute or subacute catagory. The onset in 44 per cent was indeed acute, but some of these were instances in which acute onset was superimposed upon a chronic background.

SYMPTOMS

There was upper abdominal pain in twenty-five of thirty-four patients (73 per cent) giving information on this point; in twelve of twenty-five (approximately 50 per cent), chiefly epigastric. Eight patients had general abdominal pain and in six of these general peritonitis was found at autopsy. There were no instances of pain referred elsewhere. Chief reliance therefore should be placed on pain in the epigastrium or in the liver area.

The presence of chills was a prominent symptom in twenty-three of the fifty cases (46 per cent). In sixteen of the cases chill was not mentioned, but in eleven cases chill was denied.

Sweating was mentioned in twelve cases; headache in six; vomiting in twenty-one; anorexia in sixteen; loss of weight in twenty-three and fever, ranging from 100 to 106, in thirty-four cases. Jaundice was present in twenty-two cases, not present in twelve and not stated in sixteen.

There was upper abdominal tenderness in fourteen of twenty-two patients (63 per cent) giving this information. Here again the epigastric region was the chief site, the right epigastrium or liver area more particularly. There were five instances of general abdominal tenderness; four of these were shown to have peritonitis at autopsy.

Leukocytosis was, in the majority of instances, under 20,000. Eighteen of thirty-one recorded cases (58 per cent) showed white counts between 10,000 and 20,000. A case of polycystic liver with abscess formation showed a white count of 9,500 and a carcinoma of the pancreas case showed a white count of 9,000. Eleven of the cases had white counts ranging between 20,000 and 40,000.

There was a tendency for the hemoglobin to fall as the disease progressed. The lowest was 45 per cent. A corresponding lowering of the red cell count was usually present.

AUTOPSY FINDINGS

In thirty-one of the cases (62 per cent) abscesses were present in *both* lobes of the liver. In nineteen cases (38 per cent) abscesses were found in the right lobe only. There was no instance of a solitary abscess in the left lobe. Most of the cases of right lobe involvement were of the multiple abscess type. Only five cases of single abscess of the right lobe were found, however.

The associated pathologic lesions found postmortem furnish an interesting background for discussion. An approximately complete list of anatomic diagnoses is given below:

Anatomic Diagnosis	No. Cases
Peritonitis	14
Gallstones	11

Chronic Cholecystitis	7
Septic Portal Thrombosis	6
Perforated Duodenal Ulcer	4
Perforated Gastric Ulcer	3
Appendicitis (ruptured)	3
Appendicitis (not ruptured)	3
Appendicitis (gangrenous)	3
Suppuration Mesenteric Veins	3
Carcinoma of Stomach	3
Carcinoma of Pancreas	3
Cholangitis	2
Acute Cholecystitis	2
Empyema of Gall Bladder	1
Gangrene of Duodenum	1
Suppurative Gangrenous Pancreatitis	1
Perforative Ulcer of Colon	1
Carcinoma Ampulla of Vater	1
Chronic Appendicitis	2
Cholecystoduodenal Fistula	1
Septic Pericolitis	1
Subphrenic Abscess	1
Abscess of Spleen	1
Abscess of Kidney	
Abscess of Adrenal	
Polycystic Liver	
Polycystic Kidneys	
Actinomycosis Liver, Adrenal Nodes	
Septic Diverticulitis, Sigmoid	

PELVIC

Salpingitis	1
Abscess of Ovary	1
Septic Abortion	1

A list of lesions of the liver and its appendages taken from the preceding enumeration follows:

Anatomic Diagnosis	No. Cases
Gallstones	11
Chronic Cholecystitis	7
Cholangitis	2
Acute Cholecystitis	2
Empyema of Gallbladder	1
Cholecystoduodenal Fistula	1
Polycystic Liver	1
Total	25

A similar list of lesions involving the appendix is made as follows:

Anatomic Diagnosis	No. Cases
Appendicitis, gangrenous	3
Appendicitis, ruptured	3
Appendicitis, not ruptured	3
Appendicitis, chronic	2
Total	11

In a comparison of the last two tabulations it will be seen that lesions of the liver and its appendages are associated with liver abscess more than twice as frequently as are lesions of the appendix. The argument might be advanced that acute appendicitis occurred in the presence of gallbladder or liver disease and that the appendicitis was the immediate causative factor in the liver abscess. A search of the records, however, shows there was no finding of the two conditions occurring in the same individual in this series of cases.

A list of gastric and duodenal lesions follows:

Anatomic Diagnosis	No. Cases
Perforated Duodenal Ulcer	4
Perforated Gastric Ulcer	3
Carcinoma of Stomach	3
Cholecystoduodenal Fistula	1
Gangrene of Duodenum	1
Total	12

It will be seen likewise from the above list that lesions of the stomach and duodenum, not including pancreatic lesions, outnumber lesions of the appendix. Moreover, if we compare the total upper abdominal lesions with the total lower abdominal lesions the lower are outnumbered almost three to one.

Lung abscess occurred ten times in this series. Clinically, a lung abscess may be found as a complication of an occasional silent chronic abscess of the liver. A few cases of the latter have been reported. Collapse of the lung, septic infarcts, pleural empyema, pleural effusion, pericarditis and acute bacterial endocarditis each occurred in one case.

There were three cases with abscess of the brain, three cases classed as subcutaneous abscess and pyoderma and one instance each of umbilical cord infection in a newborn; of otitis media in an infant of fourteen months; of acute osteomyelitis in a boy of twelve and of abscess of the leg in a man of sixty-three. One of the cases of subcutaneous abscess occurred in a boy 17.5 months. The remote lesions in this series therefore have occurred for the most part in infants and children. But one case of acute appendicitis in childhood in this series is recorded, namely in a boy of twelve.

DIAGNOSIS

Such recognizable symptoms of liver abscess as can be established are usually preceded by some acute or chronic illness of intra-abdominal origin. Some of the exceptions to this rule will be discussed later. A woman of fifty-nine, reported by Parenti, who had had sharp hepatic colicky attacks for three years, finally developed symptoms of liver abscess and died. At autopsy the liver showed not only multiple abscesses but in addition many calculi embedded in the liver substance. The calculi were observed to be near but not within the pus cavities. The gallbladder

was also filled with calculi. In the case reported by Webb, a schoolboy of fifteen was operated upon for acute appendicitis with accompanying peritonitis. Chill and high fever occurred on the twelfth day. On the twenty-first day an abscess in the liver was found at operation. The abscess cavity was packed and drained, with resultant recovery.

In discussing abscess of the liver, Lindquist speaks of a symptomatic triad of: (1) Irregular septic fever; (2) pain, either spontaneous or on pressure over the liver area; (3) enlargement in liver volume. In addition there are less constant symptoms which will be discussed in turn.

Fever.—The irregular septic fever in abscess of the liver is a symptom recognized by most observers. It was present in 68 per cent of the cases here reported. The symptom, however, was not mentioned in fourteen cases and it is reasonable to suppose that a considerable proportion of these ran a fever and that at least 75 per cent of such patients will show a septic fever. There is an occasional exception as in one isolated instance in this group. Here the temperature was 99 and the chart showed a curve for the most part subnormal, yet the leukocyte count ranged from 12,000 to 19,000 and at autopsy there were found not only multiple liver abscesses but also peritonitis. On the other hand, in nineteen of thirty-four cases (52 per cent) the temperature ran 103 or higher and in twenty-five cases (73 per cent) the temperature ran 102 or higher. Holden makes the differential point that in septic liver abscess the temperature tends to run high with irregularities, whereas in subphrenic abscess the temperature tends to be continuous even though moderately high. Septic fever was present in all of the four cases reported by Lindquist.

Pain.—This is not always spontaneous and must, at times, be elicited by manipulation. Schwartz and also Beaver report each a series of cases in which the onset was slow and insidious. Pain was found by Schwartz to be an outstanding symptom. In one silent case, liver abscess was not suspected at all clinically but was discovered at autopsy. In four cases following acute gangrenous appendicitis reported by Lindquist there was no pain in three and only slight pain on pressure in the fourth. In the current series of 50 cases pain was a prominent symptom in 70 per cent. Schwartz makes the observation that pain was worse in the cases where a perihepatitis existed. Dixon and Murphy call attention to a referred pain in the right shoulder area, which, when present, should suggest an investigation as to the presence of liver enlargement.

Liver Enlargement.—Percussion and palpation may give indifferent information. Peterson calls attention to variations in the position and size of the liver. In children it is comparatively larger; in adults it may vary according to posture; in meteorism the liver outline may be obliterated in varying degrees. However, several observers stress the point that demonstrable liver enlargement is an important sign. Fluoroscopic examination is an important aid. Granger makes the point that elevation of the diaphragm with obliteration of the cardio-phrenic angle in an antero-posterior view and of the anterior costophrenic angle in the lateral view means a subdiaphragmatic abscess secondary to a liver abscess. Boland, in discussing this phase of diagnosis, feels that roentgen examination cannot always be helpful. The demonstration of an elevated diaphragm is useful information but sometimes it seems difficult to determine whether the pathology is below or above the diaphragm. He quotes Le Wald, who demands that a lateral thoracic roentgenogram should always be taken. The latter brings out the complete curve of the diaphragm and seldom fails to differentiate between disease above or that below. Schwartz emphasizes roentgen elevation of the diaphragm and limitation of excursion. The restriction of excursion, however, is greater in subphrenic than in liver abscess owing to the inflammatory reaction adjacent to the chest wall.

A recognition of some of the less frequent symptoms occurring in cases of liver abscess will help to build up the clinical picture. Chills occur daily in some of the cases. Daily or frequent chills are mentioned in six of the fifty cases in this report. Schwartz found that chills or chilliness were common symptoms. Webb's boy of fifteen had a chill on the twelfth day following appendectomy. Holden's patient, a farmer, had daily chills and fever of 102 to 105. Eliason quotes Gerster to the effect that chills usually signify the entrance of septic material into the portal and general circulation, and that the chill is an important sign when it comes. He further states that a chill immediately after ap-

pendectomy suggests a rapid spread of infection into the portal system with pylephlebitis and liver involvement. If, however, there is a gradual drop in temperature post-operatively and a later rise, five to eight days later, with chilliness, the suspicion is aroused of a septic embolus in the liver and a single abscess. If chills and fever persist after evacuation of such an abscess one suspects multiple abscesses.

Sweating.—This is recorded in twelve of the fifty cases. In my own patient the sweating was very profuse and debilitating. In the eight cases of Schwartz, sweating was a constant symptom. Dixon and Murphy quote Keefe, who gives this symptom a prominent place in the clinical picture. I found no definite statement in current literature on the precise occurrence of sweating and am of the opinion that it is more prevalent in these cases than would appear from the records.

Jaundice.—When present, jaundice is at once a significant sign. It was recorded in approximately 60 per cent of these cases. Heimark and Coventry's patient, a man of fifty-five, had epigastric pain followed by diarrhea and later by jaundice. There were no other focal symptoms. At autopsy were found multiple abscesses of the liver, pylephlebitis, peritonitis, aortic stenosis, embolism of the pulmonary artery, infarct of the left lung and an edematous gallbladder. Eliason, in fourteen cases, found that jaundice was almost invariably present and early, though it was sometimes faint. Lepehne does not consider jaundice necessary in the clinical picture. In Parenti's case, with multiple calculi in the liver substance, the jaundice appeared late. It appeared late in my patient also. Jaundice, therefore, if manifest early, is a helpful sign but a sign which should not be waited for in constructing a clinical diagnosis.

Tenderness.—This was present in all of Eliason's cases. Upper abdominal in location generally and toward the liver area most often, it thus tends to focus the attention on the involved part. It was present in 63 per cent of the fifty cases. Eliason used the fist-percussion of Murphy to elicit the tenderness in some of his cases. Parenti speaks of tenderness in his patient at the eleventh rib and Ludlow, from his observations on 100 cases of amebic abscess among the Chinese, found an almost constant sign of tenderness in the sudden thrust of the thumb or end of the finger at the ninth interspace about two inches from the costal border.

Puncture.—In the search for confirmatory evidence in cases of suspected liver abscess the procedure of puncture has been the subject of considerable discussion. Schwartz feels that diagnostic exploratory puncture is dangerous and that it should be used only in the operating room when one is prepared to operate at once, a position taken likewise by Dixon, who further believes that aspiration should be restricted to cases of amebic abscess. Wilmuth recently described a method of needle exploration using a blunt pointed spinal puncture needle through which, when pus is found, iodized oil is injected into the cavity for roentgen examination and location of the size and position of the cavity. Heineman, who feels that there is no other method of differential diagnosis, has performed one hundred tappings without complications, though there is no comment as to the relative value of his findings. On the whole, when one considers the postmortem appearance of the liver in an abscessed state, with multiple cavities, some deep, others toward the surface, some large and some small, there arises considerable doubt as to the essential value of puncture, unless done at operation. Should a single abscess be present, a condition of right lobe involvement, and one which offers the best surgical prognosis, it should be discovered early, while it is still relatively small. Exploration with the needle, therefore, presents a surgical problem at the time of exploratory laparotomy when the liver may be under direct vision. Definite signs of localization may be seen at once on inspection of the liver or may be discovered by palpation. Random punctures by any other method would seem to be attended by a high percentage of failures in finding the abscess and with large possibilities of damage to healthy areas of the liver.

Holden presents a helpful tabulation of symptoms and signs with a view to differential diagnosis between abscess of the liver and subphrenic abscess as follows:

LIVER ABSCESS

1. Complicates disease or operation on gallbladder, stomach or intestine.
2. Severe chills irregularly, sweating and high irregular fever.

3. Very little or no tenderness.
4. Prognosis quite hopeful.

SUB-PHRENIC ABSCESS

1. Same.
2. No chills or sweats. Temperature continuous. Much pain.
3. Considerable tenderness.
4. Prognosis fairly good if abscess drained.

PATHOGENESIS

Liver infection of abdominal origin is most often the result of infected emboli carried from a primary focus of inflammation. Acute appendicitis is a frequent forerunner of liver abscess, a fact recognized and described by other writers on this subject. It has been shown, however, by analysis of the fifty cases in this report that infections of the biliary tract are even more often associated with liver abscess than with appendicitis. Osler suggested, thirty years ago, that disease of the bile passages was not uncommonly associated with liver abscess. Among other causes he cited parasites and foreign bodies such as a swallowed needle passing from stomach or gullet and finding lodgment in the liver with consequent infection and abscess formation. He cites also the penetration of a fish bone into the liver with resultant abscess. He mentioned echinococcus cysts with infection and, most rarely of all, liver-fluke as additional causes.

Donald Beaver (1931) from a critical study of eight cases observed that abscesses of portal origin are at first multilocular due to multiple emboli. Each multilocular abscess usually remains discrete although they may be multiple. General hepatic dissemination in this type is unusual and involvement of the right lobe is most common.

The direct cause leading to liver abscess formation is not always so easy to trace, however. In the eight cases discussed by Schwartz, the onset was slow and insidious and the only common factor was the occurrence of grippe in every case. Dixon and Murphy report a case in detail in which the cause was not apparent clinically nor did autopsy reveal it. Cabot cites a man of eighty-two with a clinical diagnosis of acute hepatitis and cholecystitis who showed multiple abscesses of the liver at autopsy.

In certain cases, according to Beaver, either due to diminished or specific virulence of the microörganism or to a specific resistance of the host, pyogenic micrococci may involve the liver in abscess formation which may persist into a chronic granulomatous stage. He describes several cases of this type and observes that extreme chronicity may occur with preservation of the original multilocular arrangement, or a solitary adequately encapsulated abscess may result.

TREATMENT

Treatment is surgical, with a diagnosis made at as early a stage of the disease as possible.

Here and there, in the literature, one finds an occasional hint of a recovery without surgical interference. One should mention, at this point, Holden's experience in one case in which at operation pus was aspirated from a liver abscess and in which the after-care consisted in intravenous mercurochrome. This patient recovered. He therefore used the same procedure in a second case but the patient died. Autopsy showed multiple abscesses of the liver. As to whether his first case was one of single abscess of the right lobe in which drainage was the prime factor in the cure or whether the mercurochrome played an important part in the prevention of diffusion of infected emboli we have no clue.

Schwartz (in 1930), and more recently Dixon (in 1932), are insistent upon a definite surgical approach through the abdominal route. They discourage exploratory puncture except at operation, when adequate drainage should then be established.

Webb, after locating the abscess at operation, used the exploring finger in the abscess cavity to connect small adjacent loculations with the main cavity.

Ludlow follows this procedure in amebic cases also. Webb not only drained the cavity but also packed it. While the single abscess furnishes the best prognosis, even this requires early operation.

In the case of an infant of seventeen and one-half months, the liver abscess was opened and drained but healing was delayed and the patient finally died. At autopsy there were signs of liver regeneration. Including this infant there were five cases in this series of single abscess of the right lobe:

1. A man of forty-five showing pneumonia and lung abscess at autopsy.

2. A woman of sixty-six, showing, at autopsy, bronchial pneumonia, cholecystitis, gallstones in

a liver abscess cavity, and a fistula between the gallbladder and the duodenum.

3. A woman of sixty-five, ill four years with repeated gallstone attacks, showing, at autopsy, a large single abscess and gallstones.

4. A man of forty-nine with perforated gastric ulcer and abscess of the right lung and bronchial pneumonia.

One sees, therefore, that operation in the later stages, even in single abscess of the right lobe, will be followed by a large mortality due mainly to complications of a major sort. Early diagnosis and operation, therefore, should be earnestly attempted.

The operative mortality is stated by Lockwood to be between 20 per cent and 50 per cent in subphrenic cases. At autopsy the observation is frequently made that sufficient drainage has not been established. This is most important. The liver is destined to be destroyed by multiple abscesses unless these are all drained. Therefore, an heroic breaking down of obstructing walls between cavities, using blunt dissection, seems justified. The early stage described by Gerster wherein the chill occurs shortly after an appendectomy or other operation may be the only time during which intravenous mercurochrome is of value, granting that this may reach a septic thrombus about the time a shower of emboli may be strewn into the liver. This procedure may be of value and need not delay early exploratory operation should signs of liver abscess appear.

The mortality has been high but the prognosis is not entirely hopeless. Even in amebic abscess cases, where the single abscess in the right lobe is the rule, the mortality is placed at about 35.7 per cent. More favorable reports are being recorded. Von Heberer had one recovery in six operated cases. Seven of Eliason's fourteen cases recovered. When he averaged his cases with others he arrived at a figure of 54.5 per cent mortality.

Webb, with the inclusion of his own reported case, found thirteen cases with six recoveries recorded since Eliason's report. A mortality of 54 per cent, therefore, should not discourage surgical interference, since without surgical interference the prognosis is most grave.

SUMMARY

Liver abscess constitutes .06 per cent of deaths from all causes. It occurs more than three times as often in males as in females, and most frequently in the fifth decade.

No specific symptom-group seems pathognomonic of liver abscess. In this brief review of fifty cases of septic liver abscess, pain, which occurred in 70 per cent, was sometimes completely absent. The high, irregular septic fever present in 68 per cent of the cases furnished a hint of possible septic portal involvement.

If, however, together with pain and high fever, the additional symptoms of chills and jaundice are demonstrable, and with liver tenderness obtainable either by means of Ludlow's thumb thrust or Murphy's fist percussion, coupled with signs of liver enlargement, one should feel justified in advising surgical exploration. One should feel fortified further in his diagnosis of liver abscess, should the history reveal a previous abdominal infection. Appendictis is not an infrequent precursor, but cholelithiasis, cholecystitis, cholangitis and inflammatory lesions surrounding the liver area are considerably more frequent, amounting in this series to 50 per cent.

Upper abdominal infections, as forerunners of liver abscess, outnumber lower ones three to one. Occasionally the probable cause is indefinable.

Exploratory puncture is useful when the liver is exposed at the operating table. Blind punctures are discouraged. A single abscess in the right lobe furnishes the best surgical prognosis. The earlier one discovers the abscess the better for the life of the patient and for the success of the surgeon. Even in this single-lobe, single-abscess type the mortality is considerable.

Adequate drainage at operation is important. Autopsies have, in many cass, shown inadequacy of drainage. This finding, therefore, suggests the possibility of more often establishing communication between the smaller pus cavities and the larger cavity which is being drained.

DIVERTICULA OF THE GASTRO-INTESTINAL TRACT*

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ESOPHAGUS

Classification.—Diverticula of the esophagus are divided into three types: (1) traction; (2) pulsion, and (3) occasional traction-pulsion diverticula.

Traction diverticula are due to a pulling force acting from outside the esophagus. The common etiologic factors are: cicatrix formation in a healing suppurative gland, mediastinitis, adhesions to the thyroid, diseases of the lungs and pleura, and diseases of the spine. These diverticula characteristically point upward and outward to a greater or lesser extent from their bases to their apices. Thus, they rarely retain food or mucus and are almost invariably symptom-free. For this reason they are of academic interest only.

Occasionally the apex of the sac is low enough to allow an accumulation of food particles. These cases are known as traction-pulsion diverticula and they sometimes become quite large. However, even then they seldom are of clinical importance and are usually accidentally discovered on roentgen or post-mortem examination. Their location may be in any portion of the esophagus, usually, however, below the upper third.

Pulsion diverticula are known as Zenker's diverticula. They occur in the cervical region and arise from the unsupported esophageal wall directly opposite the cricoid cartilage. The location is due to a combination of two factors: (1) a divergence of muscular fibres at this point, leaving a small triangular area uncovered by muscle where the mucosa and sub-mucosa can be forced out by presure; and (2) the failure of the cricopharyngeal muscle to relax in the act of deglutition, causing herniation of the pharyngeal wall above the cricoid.

Diagnosis.—The history, symptoms, and physical findings of this type of diverticula are quite characteristic. Difficulty in swallowing, choking sensations, nausea, raising of much mucus from the throat, and regurgitation of food are the common symptoms. A visible or palpable tumor in the neck is noted in about one-third of the cases. This tumor is usually on the left side. Pressure on the recurrent laryngeal nerve may cause hoarseness. Coughing often causes a bulging of the sac and occasionally the sac may rupture into a bronchus. Weight loss is almost a constant finding. The diagnosis is made by means of the X-ray. Fluoroscopically after barium administration, the sac can be seen distinctly, usually in both lateral and antero-posterior positions.

Treatment.—The treatment of the condition is surgical and it should be as conservative as possible. Occasionally, when the diverticulum is small and when its opening is large, dilatation with large sounds will relieve the symptoms. Surgical procedures usually employed are those described by Murphy (two stage), Sippy-Bevan (infolding of the sac with a series of purse string sutures), C. H. Mayo (two stage) and Chevalier Jackson with an esophagoscope for guidance). The latter procedure has been highly successful in skilled hands.

DUODENUM

Incidence.—The incidence varies according to various observers from 0.5 to 5.0 per cent. In 1920, Case found eighty-five cases in 6,847 gastro-intestinal studies or an incidence of 1.2 per cent. In 11,470 patients examined by X-ray the diagnosed incidence of diverticulosis was 2.5 per cent. This is an average taken from the figures stated by five X-ray observers.

Classification.—Duodenal diverticula have been classified heretofore as true or false; or congenital or acquired, according to their supposed origin. Odgers suggests the following classification:

1. Primary—where there is no obvious cause for their appearance. This corresponds roughly to the false or congenital group. These occur beyond the first portion.

2. Secondary—where there is some cause for their production, such as old or recent duodenal ulcer or traction of adhesions from neighboring structures. This is the true or acquired group and occurs usually in the first portion.

3. Those due to dilatation of the papilla of Vater or of the bowel wall about it.

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Etiology and Pathology.—The secondary group will not be considered here because their pathology is essentially that of the etiological factor. The third variety will also be ignored in this discussion because those due to dilatation of the papilla of Vater are usually associated with liver and bile passage diseases, pancreatitis, or are occasionally of congenital origin. Those diverticula due to out-pouching of the bowel wall about the base of the papilla of Vater cannot be of clinical importance. Only the primary group will be discussed.

Etiologically these diverticula have been explained from various angles. The older observers regarded them as acquired pouches of either pulsion or traction types. More recently they have come to be regarded by the majority of writers as being of congenital origin. There are many reasons to support this latter view though there is no definite proof. However, it is true that they are always found at actual or potential weak spots in the bowel wall.

These diverticula vary greatly in size and shape. They range from a few millimeters in diameter and depth to narrow pockets six centimeters or more in length, on the average being one to two centimeters in depth. Most have an expanded fundus narrowing to a neck of variable size which opens into the bowel. Characteristically they are composed of mucosa and submucosa which is thin and atrophied and the muscle coat is absent. These primary diverticula are often multiple and are usually within the duodenal loop and in relation to the pancreas; either in front of, behind, or imbedded in the head of the pancreas. Post-mortem studies lead one to believe that the condition is one of old age. However, radiologists are finding them in early adult life occasionally. We may assume that the anlage of the diverticulum is present in young people, but it is only in those of advanced years that the pouches become large enough to be sources of symptoms or objects of interest after death. Spriggs and Marxer have noticed such growth in diverticula.

They are usually found as empty sacs lying in a bed of areolar tissue in relation to the head of the pancreas. The great majority are innocuous because of: (1) their retroperitoneal position allowing great distention; (2) the dependent position of their opening into the bowel; and (3) the relative sterility of the duodenal contents. Those, however, which do not empty readily may cause distortion or obstruction of the duodenum or bile passages by distention. Other complications may be: diverticulitis with perforation, peridiverticulitis, ulceration with hemorrhage, and carcinoma, all of which have been discovered. Also, cholangitis, gallstones, and acute and chronic pancreatitis have been found associated with diverticulosis in which the diverticula were probably responsible.

Signs and Symptoms.—We believe that by far the larger proportion of diverticula are symptomless and their discovery is almost invariably accidental. It seems reasonable to suppose that in the absence of complications there can be no symptoms caused by such diverticula. There is no evidence, physiological, pathological, radiological, or mechanical to explain the symptoms. However, it is probable that those which retain the barium, which in our experience constitutes a very small percentage of cases, are the ones that cause symptoms.

There are no certain symptoms and signs which are diagnostic of these pouches. Vague digestive disturbances are sometimes noted. These are: a feeling of heaviness and distention after food, perhaps nausea, but no actual vomiting. Sometimes there is diarrhea. A history suggestive of peptic ulcer may be obtained which on careful analysis will be found wanting in one or more diagnostic features.

Diagnosis.—No case has ever been diagnosed on clinical evidence. The only method of diagnosis is by X-ray examination after an opaque meal. The technic is simply that of a routine barium meal consisting of fluoroscopic and serial film examination. No particular attention need be given to the type of opaque medium used. The fluoroscopic examination should be carried out in the erect, horizontal and oblique positions. Serial radiography is of value because it shows the diverticula in filling and emptying phases. Duodenal diverticula must be differentiated from: Ulcer craters, redundancies (congenital or acquired), barium retained in the colon from a previous examination, biliary or renal calculi, and calcified glands.

Prognosis.—It must be remembered that the symptoms described and the few serious complications mentioned in the preceding paragraphs are collected from various sources in literature

and that they represent an extremely small proportion of known cases. Also it must be remembered that the great majority of cases discovered roentgenologically or by post-mortem give no history indicating that they ever cause trouble during life. In our experience, only one diverticula could be regarded as the cause of symptoms. In this case there was ulceration in the diverticulum with resultant hemorrhage. Haudek, in 1924, studied carefully the results of operations for duodenal diverticula and made the statement that in no case has the removal of the pouch cured the abdominal symptoms for which the operation was performed. Occasionally, duodenal diverticula may give rise to symptoms, and exceptionally, they may be of serious import.

Treatment.—No patients with duodenal diverticula should be regarded as having symptoms referable to the diverticula unless all other lesions of the abdomen have been definitely ruled out. In such patients a medical regime should be carried out. Such management will relieve symptoms in a short period of time. Spriggs suggests that the optimum position for emptying of the diverticula be determined by X-ray observation of its mouth, and that the patient assume this position for half an hour about three hours after meals. Also, he recommends that liquid petrolatum be given in small doses night and morning for lubrication of the pouch. Lastly, attention is paid to the digestion and an attempt is made to tone up the entire alimentary canal.

Surgical treatment is never justified in uncomplicated cases because the risk of future complications is so small that it can be disregarded. If a complication should arise, surgery must be resorted to as in any other acute abdominal condition and the treatment followed will depend on the surgeon's skill and judgment.

Jejunum and Ileum.—Primary diverticula of the jejunum and ileum also occur but even less than in the duodenum are they of significance. Their diagnosis in the living is made only by X-ray after an opaque meal and they are of interest only as pathological rarities.

COLON

Incidence.—From post-mortem studies all observers give the occurrence of colonic diverticula to be well under 1 per cent. X-ray studies show a much higher percentage. This cannot be taken as the incidence for the entire population as those examined by X-ray usually have some symptoms, definite or indefinite, pointing to disease of the gastro-intestinal tract. The incidence according to age is greater, by far, in patients above forty-five and, according to sex, males and females are affected about equally.

Classification.—We classify colonic diverticula into three groups:

1. Diverticulosis; in which diverticula are diagnosed by X-ray but in which there is no evidence that they are of significance to the patient, subjectively or objectively.

2. Diverticulitis—uncomplicated; in which there is evidence of diverticula associated with signs of inflammation and infection.

3. Diverticulitis—complicated; in which diverticulitis is present with signs of perforation, abscess formation, fistulæ or obstruction.

There are also a fairly definite group of findings noted on colon examinations which seem to appear as forerunners of diverticulosis. This is known as the pre-diverticular stage, and is characterized by a serrated or saw-tooth appearance of the colon associated, usually, with spasm. Diverticulosis and diverticulitis have repeatedly been observed to occur in colons which originally had this appearance.

Etiology and Pathology.—The process of development of diverticula and their cause is not definitely known. In the true sense of the term they are not congenital because they are not noted in infancy and childhood. However, they arise at potential or inherently weak spots in the bowel and the immediate cause of their formation is based upon increased intra-colonic pressure due to constipation with a resultant cycle of inflammation with lowered local resistance. It is an unsettled question whether or not diverticula of microscopic size are present at the time the pre-diverticular stage is noted. It appears that the question is one of academic interest only, for, certainly, at this period the signs which we interpret as being due to irritation are present.

Once formed, the diverticulum assumes a bottle-shape with wide body and narrow neck. It is usually formed of mucosa which has herniated through the muscularis. It may be single but there are usually multiple diverticula in an affected colon. Diverticulosis may be found throughout the entire colon, including the appendix, but the descending and sigmoid portions are usually the most markedly involved areas.

The majority of patients with a diverticulosis, however, do not develop a true diverticulitis. Furthermore, only a small percentage of patients with diverticulitis develop complications. Most often the changes which cause symptoms and require treatment arise in the lower descending and sigmoid portions, due no doubt, to stasis which normally occurs in these portions and to the character of the fecal content which in these portions is formed rather than liquid or semi-solid as in other regions.

The inflammatory changes leading to diverticulitis and its complications begin in the diverticular sac with consequent round-cell infiltration in the bowel wall and ulceration. This process extends into the mesentery with thickening and often tumefaction. Abscess formation may result as a result of a perforation, with symptoms simulating appendicitis, on the left side. Peritonitis after perforation is usually walled off because the development of the process is slow. Obstruction, which occasionally occurs, is due to extrinsic reaction and contraction of the bowel wall due to long standing inflammatory changes. Fistula formation sometimes occurs and is the result of perforation.

Carcinoma apparently is not a result of diverticulosis. Occasionally, the two are associated, but not frequently enough to lead one to believe that diverticulosis predisposes to carcinoma.

Symptoms and Signs.—In the pre-diverticular stage, symptoms are slight if present at all. Constipation is usual and there may be tenderness on palpation over the involved area.

It must be remembered that a very extensive diverticulosis may be present with no discomfort to the patient and that its discovery is entirely accidental in the greater number of cases. However, a slight degree of diverticulitis will produce definite and often marked symptoms.

Pain is the outstanding symptom of diverticulitis. It is variable in type, ranging from intermittent and sharp to constant and dull. It is usually below the umbilicus and most often on the left side. Constipation is usually present, though occasionally there is diarrhea. Abdominal distention and flatulence are often noted. An easily palpable tender sigmoid is almost always discovered and tumefaction is frequently present. Urinary disturbances are common because of the close proximity of the sigmoid and bladder with secondary involvement of the bladder wall.

Diagnosis.—Roentgen examination is the one procedure which definitely settles the diagnosis. Either the barium meal or the barium enema may be employed, but the barium enema is the more important of the two. Diverticula of variable size and distribution appear as rounded projections on the bowel contour. Deductions as to the presence of diverticulitis are made from the degree of spasm present. The length of the neck of the diverticulum must be noted. If the neck is long or the sac is seemingly isolated we have good evidence of thickening of the bowel wall. Fecal concretions in the sac appear as filling defects. Filling defects of the colon may occur either as the result of spasm or fibrosis with extrinsic pressure from reaction to the irritation. These can always be differentiated either by serial films or reexamination. Occasionally, the filling defect of diverticulitis simulates that of carcinoma. The differentiation here lies mainly in the fact that in diverticulitis some mobility of the wall usually remains while in carcinoma the wall is absolutely rigid. Also, diverticulitis usually affects a longer segment of the colon than does carcinoma and signs of diverticulosis are present in other portions of the colon.

Prognosis.—The prognosis under proper treatment is good. Patients will be kept symptom-free and free from complications under an adequate medical regime in all but a negligible percentage of cases. Surgical treatment is indicated only in the complicated cases.

Treatment.—In acute cases, rest in bed, ice bags to the abdomen, and irrigations with hot saline are indicated. The diet should be low in residue. When the condition is not acute, these patients should be instructed to take a bland diet and to take small doses of mineral oil three times a day. Constipation must be guarded against and it can best be prevented by proper diet and the use of mineral oil. Patients with diverticulosis would do well to observe similar precautions to lessen the danger of development of diverticulitis. Surgical treatment of the complications is too variable to be considered in this short time.

CONCLUSIONS

Diverticula occurring in the cervical region are the only type of esophageal diverticula of com-

mon clinical significance. They occur as the result of increased pressure causing herniation of the wall at the level of the cricoid cartilage. Their diagnosis is made from the history and X-ray findings. Treatment is surgical.

Duodenal diverticula are of primary and secondary types with a third group due to dilatation of the papilla of Vater or of the adjacent bowel wall. The significance of primary diverticula of the duodenum is usually exaggerated and in the vast majority of cases they cannot be held responsible for symptoms. X-ray establishes the diagnosis. A medical regime is indicated if it can be shown that a primary duodenal diverticulum is causing symptoms. Surgical intervention is necessary if a complication in duodenal diverticulosis arises.

Colonic diverticula are classified as: (1) diverticulosis; (2) diverticulitis—uncomplicated; (3) diverticulitis—complicated. They do not cause symptoms unless inflamed or unless complications occur. Their diagnosis is established by X-ray. Treatment is medical unless complications arise, when it becomes surgical.

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GLOBUS HYSTERICUS*

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PATIENTS with globus hystericus, we find, are prone to consult one who specializes in the nose and throat, although it is a symptom which has its origin outside the throat. The incidence of globus hystericus has more than doubled in the last two years, according to our records. This is due, no doubt, to the depression, with its financial worries and mental strain.

Having these cases thrust upon us, we were led to search for information. It was found that text-books do not help much. The subject is dismissed in a few words. Furthermore, not much is found in the literature of the last half century. Most of it is in German, written by neurologists. Nothing has ever been written by throat specialists. The literature deals for the most part with the theoretical rather than the practical aspect of the problem.

*Read before the annual meeting of the Minnesota State Medical Association, St. Paul, May 24, 1932.

SCOPE OF PRESENT STUDY

It is the practical aspect that this paper will emphasize: how to recognize this condition, and how to treat it. We shall discuss the symptoms by describing what we consider a typical case. Then we shall mention some atypical forms. Thereafter the etiology and pathology can be discussed to better advantage. Finally, what to do for them.

This study is based on twenty-four consecutive cases extending over a period of four years, in an eye, ear, nose and throat practice.

A TYPICAL CASE

This is our conception of the typical globus hystericus patient. Being predominantly female, we shall speak of "her." She wears a drawn, care-worn expression. She has a peculiar throat trouble which she believes must be serious. She feels a "ball," "lump," "pressure," or "tightness" in her throat. It feels as though she should be able to swallow it, but fails. It appears and disappears suddenly and unexpectedly during the day. She wonders if a food particle might be lodged there or whether it might be adenoids, a goiter, cancer, or some horrible disease. We now suspect globus hystericus. Upon questioning her, we find the trouble starts later in the day while about her work, especially when she is tired. She has noticed that she never has it when visiting, when having a good time, or when she becomes absorbed in something interesting. She is of a "nervous" disposition, and more so since this trouble began.

Although it is only for the purpose of assuring the patient, we now make an examination, which we expect to be negative. The outside of the throat is palpated. The pharynx and larynx are viewed through mirrors. If she has worried about foreign bodies, a finger is slipped down the throat to convince her of the thoroughness of the examination. No intimation is given to the patient as to the nature of her trouble until this examination is completed.

We now settle down and have a heart-to-heart talk. She is told that such cases are not unusual. We tell her we found nothing wrong in her throat. We explain that she has a nervous disorder. Some sort of worry, or deep anxiety, is at the bottom of it. At this point some patients will tell the rest of the story. It may be money matters, family troubles, grief, or failing health. But often they are incredulous. Often they are not conscious of any worry or anxiety. The patient is then drawn out at length on matters concerning her private life. In some cases we have found it of advantage to have the patient go home and to return a day or two later.

Twenty-two, or 96 per cent, of our patients had symptoms corresponding very closely to this typical one. One of the two exceptions complained of a feeling of discomfort in the left side of the throat. The other exception was remarkable. She had a "metallic taste" in her throat, which would come and go exactly as the lump in the typical cases. The literature mentions atypical cases which are associated with stomach neuroses. Bilz[1] describes at length the case of a young girl in whom a foreign body seemed to rise gradually from the abdomen up into the throat.

ETIOLOGY

It was found that during the period covered by this study about one in every 400 cases in a practice limited to eye, ear, nose and throat was diagnosed globus hystericus. Of twenty-four cases, the age limits were seventeen and forty-five, the average being thirty-three. Eighteen were females and six males, indicating a ratio of three to one.

The causes can be summarized as follows:

Worry	8
Sexual neuroses	5
Monotony or drudgery	4
Doubtful or undetermined	7

Worry is responsible for more than a third of the cases. Money and family troubles are the principal causes of worry. One had a fear of cancer, another of tuberculosis. One of the cases under this class was remarkable. This was the one referred to above as complaining of a "metallic taste" in the throat. A young girl, a teacher, had quarreled with her lover, and as a result joined a "wild party." She was led into indiscretions which brought remorse and fear of consequences. After much urging, she was induced to go to her family physician for examination. For two or three weeks he was uncertain as to her condition. When she was finally informed that she was not pregnant, the metallic taste immediately disappeared, never to return. This case was therefore proven to be a true globus, in spite of the unusual symptoms.

Sexual neuroses were found responsible in four cases, all in married women. Two of these were irregular sex practices (coitus interruptus). Another was vaginismus in a young bride. Treatment was advised by her family physician to whom she was sent, but was refused. If she had accepted the treatment as advised, no doubt her globus could have been cured. The fourth case was a woman who had begun to use contraceptives for economic reasons, although she believed that to do so was immoral, and admitted that this was continually on her mind.

CHART 1

Case	Age	Sex	Etiology	Immediate Results	Remote Results
1.	33	F	?	Disappeared	Cured
2.	17	F	?	Disappeared	Cured
3.	37	F	Worry	Disappeared	Cured
4.	24	F	Sexual neurosis	Improved	Improved
5.	45	F	Monotony	None	Worse
6.	35	F	Worry	Improved	No change
7.	37	F	?		
8.	32	F	?	None	Cured
9.	24	M	Monotony	Slight improvement	Cured
10.	40	F	Worry	Improved	Recurrence
11.	33	M	?	Disappeared	Slight recurrences
12.	34	F	Worry	Disappeared	Slight recurrences
13.	24	F	Sexual neurosis	Disappeared	Cured
14.	28	M	?	Disappeared	Cured
15.	39	F	Worry	Disappeared	Cured
16.	44	F	Worry	Disappeared	Cured
17.	30	M	Monotony	Improved	Cured
18.	45	M	Monotony	Disappeared	Cured
19.	36	F	Worry	Diagnosed laryngitis by another	
20.	26	F	?		
21.	21	F	Sexual neurosis	Disappeared	Cured
22.	38	F	Sexual neurosis	Disappeared	Cured
23.	22	F	Sexual neurosis	No change	No change
24.	39	M	Worry	Improved	Cured

In the four cases in which monotony or drudgery is given as a cause, there were three men who were overworked in their regular occupation. One was a physician who diagnosed his own case and cured himself by getting help and taking up golf.

It should be mentioned that, of the seven cases in which the cause was undetermined, four were in the early part of the series. We feel that if these early cases had been studied as carefully as the later ones, causes would have been found for at least some of them. We believe now that sexual neuroses are etiological factors more often than this report indicates, due to the difficulty of getting frank statements on such matters. In Bilz's case, referred to above, there was also a large element of sexual neurosis. Buch[2] also, in his long article, touches on the relation of sexual neuroses to globus.

PHYSIOLOGY OF GLOBUS

The evolution of theories as to the mechanism of globus hytericus is described by Buch. It was believed up to the seventeenth century that the condition was an actual migration of the uterus (or ghost of the uterus) into the throat. In the time of Hippocrates, it was believed "that the uterus was a living creature, which feeds on masculine semen, and when this means of nourishment was too scanty, looks around for other sources, and so in hypochondriacs it wanders upwards as high as the throat." Later, it was thought to be a spasm caused by peristaltic mo-

CHART 2

Immediate Results

Cured	12
Improved	5
No change	3

Remote Results

Cured	14
Improved	1
No change	2
Worse	1
Recurrences after disappearance or improvement	3
Wrong diagnosis	1

tions ascending from the abdomen up the esophagus. In 1851, Romberg maintained it was not a spasm of the esophagus but a neuralgia of the respiratory and gastro-intestinal tract. Other theories were: a sensory disorder;[3] a visceral neuralgia and paresthesia; Charcot believed it had a connection with the ovaries. Buch believes it is a sensory neurosis of the sympathetic system. He states he has produced the globus sensation by pressure on a plexus in the pelvis at the level of the last lumbar vertebra. By some it is believed to be a contraction of the cricopharyngeus muscle. A rheumatic origin has even been claimed.[4] Jacobson[5] of Chicago, in 1924, reported experiments using barium paste X-rays of the esophagus from which he concluded that there is a spasm of the esophageal muscle. He thinks that hyperesthesia of the throat may also be a factor. The nature of this strange symptom is, therefore, still a problem. Buch says, "We have no analogy, in the realm of pathology, to the globus sensation."

TREATMENT

Having discovered the cause, an attempt is made to convince the patient that such is the cause. The success of treatment depends on one's ability to make the patient accept the diagnosis of globus. With some, that is extremely difficult. Three of the patients insisted on having X-rays of the throat.

Seventeen out of the twenty-four patients never returned after the first consultation. For the purpose of making this report, a questionnaire was sent out, and contacts were made in all except two cases. Chart 1 shows a summary of the cases. Chart 2 summarizes the results of treatment. These results have been gratifying. It should be noted that Case 23, one of the few with unfavorable results, is the one referred to previously as having refused corrective treatment for vaginismus as advised. In another unfavorable case, No. 6, there was no chance to remove the cause of the patient's worry; she was the mother of seven children and her husband had been sent to the state prison at Stillwater. The one essential part of the treatment is to convince the patient of the nature of her ailment. As stated before, she is told that it is a nervous disorder which has some underlying cause; that if possible this underlying cause must be found and removed. The word "nervous" is satisfying to patients. The word "mental" seems to embarrass them, so is never used. In handling these patients, it is advisable to assume a serious, sympathetic manner. The idea of a relation between worry and the lump in the throat, of course, never fails to surprise them. It must be pointed out tactfully.

Six of the patients stated they had previously consulted other physicians without being benefited. Two had been given prescriptions and local treatment to the throat. Three had had their tonsils removed. Of these latter three, two were made worse. This is exactly what one might expect, for the reason that the failure of the operation to cure would be just one more cause for worry.

The sixth patient had been told that there was nothing wrong with her. This, of course, is a glaring mistake. Every globus patient knows there is something wrong. When that patient was given our routine treatment, that is, told that she did have a definite throat trouble, a sort of nervous spasm, and that the cause must be removed, she was cured immediately.

SUMMARY

Globus hystericus is a rather common condition, although little seems to have been written on the subject. It is often unrecognized.

The theory of its physiological mechanism is not well established, but it is probably a muscular spasm.

It may be caused by worry, monotony, or drudgery, or sexual neuroses. Its treatment is psychic and has been found surprisingly satisfactory. All local treatment is contraindicated. Immediate and permanent results were obtained in a high percentage of cases.

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EMERGENCY TREATMENT OF EYE INJURIES*

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A VERY careful emergency examination is necessary for every eye injury of any significance. Even the most trivial command respect, for these sometimes cause blindness in spite of the most competent treatment, while severely injured eyes, on the other hand, often respond beyond the fondest expectations. Complications, as hemorrhage, irido-cyclitis, retinal and choroidal tears and detachment, often cause disappointment when the external structures are uninjured. The final outcome of many injuries cannot be estimated until several months have elapsed but immediate examination and treatment often saves much vision and considerable suffering. Accidents are rapidly disappearing in industrial plants. The effective use of goggles with or without unbreakable lenses, safety devices, proper medical care, and education of the employee have all helped. The removal of foreign bodies in the eye by the fellow mechanic who is handy at it, is almost eliminated. In the New York eye infirmary only thirty cases of intra-ocular foreign body cases were observed in 1930 while twenty-five years ago it was not uncommon to see five or six in a single afternoon. At the present time, more intra-ocular foreign bodies are seen in farmers and children than mechanics. The use of dynamite by farmers accounts for the frequency among them.

There are two very important considerations in the examination of injured eyes: first, sufficient illumination; and second, magnification enough to make the smallest of foreign bodies and wounds visible. Even the corneal microscope is sometimes necessary, for this procedure often reveals valuable information otherwise undiscoverable. Recently, I discovered an almost microscopic piece of steel resting in the iris twenty-four hours after the patient had a slight stinging sensation while pounding on an automobile shaft.

The most common of all injuries is the foreign body in the cornea. In industrial centers, these are imbedded metals with oxidized bases which leave a brown stain when the foreign body is removed. Removal of the stain is essential. Should it remain, convalescence is delayed, and vision may ultimately be reduced. A sharp foreign body spud, or the dental burr will effect its removal satisfactorily. Cauterization following removal prevents infection and stimulates healing. As in the infected ulcer following injury, the eye is anesthetized with cocaine or butyn, the area dried and touched with phenol, iodine, or tri-chloracetic acid applied on a finely pointed applicator. All of the above caustics are satisfactory, but tri-chloracetic acid produces much less after-pain and is always effective. An anesthetic ointment of holocaine or butyn, plus a pad and adhesive, insure comfort for the next twenty-four hours.

In the event no foreign body is found, fluorescein, which stains effectively, should always be used to elicit abrasions or incised wounds. Its routine use in ophthalmic practice is almost universal.

When incised wounds of the lids are present, disfigurement often results from lack of approximation. This may be remedied by suturing the lid margin first, passing the suture entirely through the margin of the lids.

Burns of the eye are produced by hot metals, acids, alkalies and freezing mixture of ammonia. The relief of pain and prevention of adhesion (symblepharon) are most important. Caustic alkalies and slaked-lime burns which produce the most serious results should be painted with U.S.P. Glycerite of Tannic Acid. This stops the destructive action of the agent and prevents marked opacification of the cornea. The immediate appearance of a burned conjunctiva may not show the final condition unless the destructive action of the chemical is neutralized at once. Relief from pain may be obtained with anesthetic ointments, which are more satisfactory than aqueous solutions.

Incised wounds, penetrating the chambers, require immediate disinfection and closure. Conjunctival flaps after VanLint method, or the sliding flap, have saved many eyes otherwise hopelessly lost. Excision of a prolapsed iris

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should be practiced before suturing the flap. Replacing a prolapsed iris is rarely advisable. The conjunctival flap usually recedes in four or five days, leaving a solidly healed scar. Adhesion of the conjunctiva to the cornea seldom occurs and is easily separated with a spatula.

Scleral or mattress sutures such as are used in ventral hernia will suffice to close a scleral rupture. The prognosis should be guarded and early enucleation practiced in the more severe penetrating wounds. A decreased tension, evidence of severe uveitis with leukocytic deposits upon the posterior surface of the cornea, is always serious. The absence of ciliary injection must not be relied upon too greatly, for sympathetic ophthalmia occurs when the exciting eye is apparently quiet, except for changes in the posterior chamber.

Traumatic cataract is always difficult of removal and the loss of vitreous should be guarded against. Its fluidity is taken for granted after such accidents. Vitreous loss, the most serious complication of intra-ocular surgery, ultimately gives poor results in a majority of cases. If the nucleus is small or absent a small anterior incision with the packet flap, has proved most satisfactory in my hands.

Contusions, producing hemorrhage, dislocation of the lens, and retinal detachment, are not uncommon. Rest in bed, and local applications are most beneficial. Retinal detachment may be cured in a small percentage of cases by skillful operative procedure, but its results are disappointing in many cases, as each and every operative procedure is a decided gamble, with something to gain and little to lose. Much has yet to be learned in spite of the already tremendous advance already made.

The problem of the intra-ocular foreign body is always a serious one. The type of metal, site of entrance, the projectile force and its position in the globe are all factors which must be considered. Localizing X-rays are absolutely necessary before any attempt at removal is made. Some foreign bodies are well retained within the globe for many years without causing serious trouble and their removal is not always the best procedure. Copper, although not well retained, usually causes less damage than the trauma produced by its removal. As pointed out by Kiehle, the first result is not the final result and vision may deteriorate after months or years, even though normal vision was present immediately after operation. The route of removal is also of prime importance. One pathway of entrance and removal is to be preferred, and where the lens is uninjured, the posterior route is chosen. With very small foreign bodies, however, which can easily pass around the zonule of the lens, this is to be desired to making another thrust into the vitreous body. Enucleation is no longer considered necessary simply because an eye harbors a foreign body. Bulson, a few years ago, reviewed the published cases of retained foreign bodies. The damage resulting was sometimes slight even after many years. Parson states that most intraocular foreign bodies should be removed and always offer a bad prognosis. He excepts cases, however, that have sterile foreign bodies, without irritation, no reduction of visual acuity, and the removal of which will undoubtedly destroy vision. Prognosis should only be given after the lapse of considerable time.

Following severe injuries with infections, and in traumatic inflammations, the valuable adjunct, non-specific or foreign protein therapy, offers the greatest single curative agent. Whatever may be the feeling of the general medical man regarding foreign proteins, as milk and typhoid vaccine, their use in ophthalmology is well established and unquestioned. Many prefer 10 c.c. of boiled milk but a long series of cases treated by small doses of typhoid vaccine intravenously, has given very satisfactory results. This treatment is not without its danger, however. Large doses of sodium salicylate, approximately 1 grain for each pound of body weight, in a starch retention enema is admirable for aged persons or those in whom the vaccine may be contraindicated. Recently Benedict has advocated colloidal gold for the same purpose with good results.

In cases in which the inflammatory reaction is out of all proportion to the injury sustained, endogenous infection may be the exciting factor which keeps up the inflammation. Latent syphilis is often excited by injury and even when there are no other clinical signs, an ocular inflammation may be due to this infection. Generally cases of this type do not respond to anything but specific treatment. Tuberculosis may also be present and be aggravated by injury, although there is usually evidence of pre-existing

ocular disease before the injury has taken place. A complete physical examination reveals the cause of such inflammations as are not produced by trauma alone.

Conclusions.—Ocular injuries, of any significance, require a very careful examination, sufficient illumination, and magnification. Aseptic removal of foreign bodies and cauterization of the area results in early healing. Alkali burns are best treated with glycerite of tannic acid. Perforating injuries should have the wound closed by means of conjunctival flap after excision of the prolapsed iris, if necessary. Intra-ocular foreign bodies are serious problems which require considerable experience and X-ray localization before removal is attempted. Pre-existing infections complicate the picture, especially when such infections are endogenous.

OCULAR LESIONS OF GENERAL DISEASES*

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DURING the past few years internists have begun to realize that eye examinations in certain general diseases are of value in diagnosis and prognosis. A knowledge of the clinical pathology of the eye in general diseases is indispensable. An examination of the fundus of the eye with the ophthalmoscope is becoming an important procedure in the general physical examination of the patient. A summary of the ocular lesions most likely to occur in some of the most frequent general diseases follows:

Exophthalmic Goiter: The general disease of which the eye signs are best known is that of exophthalmic goiter. The exophthalmos is usually bilateral, but occasionally is unilateral. However, the exophthalmos may even be absent. Von Graefe's sign is present if the upper lid does not follow downward movements of the eyeball. Dalrymple's sign consists of retraction of both the upper and lower lids. If decreased winking occurs this is known as Stellwag's sign. When convergence of the eyes is hindered Moebius' symptom is present. Gifford's sign is difficulty in everting the upper lid. When the head is bent forward and the patient requested to look upward and no wrinkling of the brow occurs this is known as Joffroy's sign. On closing the lids a fine fibrillary tremor of these structures is sometimes noted in normal patients, but in cases of goiter it may be very pronounced. This condition is called Rosenbach's sign. Other less frequent symptoms are swelling or edema of the lids, pigmentation of the lids, and paralysis of extra-ocular muscles.

Syphilis: Syphilis may invade every part of the eye. Many cases of orbital periostitis are due to lues. The affected portion of the orbit becomes swollen and hard, the skin overlying it reddened.

Syphilitic lesions rarely appear on the eyelids. The lid may be the seat of a chancre either on the skin or on the conjunctival surface. In the tertiary stage a gumma may appear in the lid.

Interstitial keratitis is the most frequently seen ocular lesion of syphilis. About 90 per cent of the cases of interstitial keratitis are due to lues, the remainder being due to tuberculosis. The symptoms of an interstitial keratitis are decreased vision, pain, photophobia, and lacrimation. A round cell infiltration appears in the middle and deep layers of the cornea and the latter becomes lusterless and dull. New formed blood vessels resembling a brush appear in the deeper layers of the cornea. Interstitial keratitis is usually due to a congenital lues; very rarely to the acquired disease. It appears most frequently between the ages of five to sixteen, but may appear as late as the fortieth year.

About 50 to 60 per cent of the paralyses of the extra-ocular muscles are due to lues.

Retinitis, choroiditis, or chorio-retinitis may be due to lues. Ophthalmoscopically it is difficult to determine whether they are due to either lues or tuberculosis. The differential diagnosis depends largely on clinical and laboratory findings. Accompanying "dust-like" opacities in the vitreous are more characteristic of lues. In syphilis the choroidal lesions are usually more sharply circumscribed, smaller and more rounded in outline.

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Acquired syphilis produces approximately 50 per cent of the cases of iritis. In some instances the iritis showing the characteristic posterior synechiæ, precipitates on the posterior surface of the cornea, indistinctness of the iris markings, and ciliary injection cannot be differentiated from one due to other causes. However, there is a form of luetic iritis which is different from others. In this case nodules appear in the iris. They have a yellowish-red color, are the size of a pin's head or larger, and are situated on the outer or inner margin of the iris, rarely in the middle. Later the nodules disappear and leave at their site broad and firm posterior synechiæ.

Optic neuritis, choked disc, and primary optic atrophy may be produced by a tertiary lues but ophthalmoscopically they cannot be differentiated from those due to other causes.

Tuberculosis: Tuberculosis of the eye is rarely found in patients under treatment for active tuberculosis. Primary tuberculosis of the eye is very rare. For this reason a tuberculous eye lesion depends on the presence of a tuberculous lesion elsewhere in the body and very frequently a careful physical and X-ray examination are necessary to locate this lesion, which is usually quiescent or healed and located in the lungs, tracheobronchial glands, or hilus lymph glands.

In an orbital tuberculosis the temporal margin and the zygoma are most frequently involved. At first induration and swelling occur at these sites. Later the abscess ruptures and leaves a fistula. On probing, denuded and roughened bone can be felt.

Tuberculosis of the lids usually occurs in children; it is very chronic, non-painful, and usually unilateral. The lid is thickened. If ulcers are present they are irregular in shape with reddened and livid borders. In the later stages there is puckering.

In the conjunctiva, tuberculosis produces irregular dirty gray ulcers. Grayish red granulations protrude through necrotic material in the bases of these ulcers. In the vicinity small gray nodules (tubercles) may be seen.

Tuberculosis of the cornea is very similar to leutic interstitial keratitis. Usually the differential diagnosis must be made by means of the Wassermann and tuberculin tests. However, the tuberculous infiltration may be more limited to one portion of the cornea than the luetic infiltration. Beginning at the limbus, tongue-like projections protrude into the parenchyma. Lesions of the cornea are usually associated with an episcleritis and uveitis.

Tuberculosis of the iris produces either miliary tubercles or a chronic iritis. The tubercles may arise simultaneously in different locations. Usually they appear as small, gray, transparent nodules. The blood vessels surrounding them are congested. The chronic iritis is characterized by posterior synechiæ, deposits on the anterior capsule of the lens, pupillary membrane, and large lardaceous (mutton fat) deposits on the posterior surface of the cornea. Secondary cataract is a frequent complication.

Tuberculosis of the choroid appears for the most part under the form of isolated foci of inflammation scattered over the choroid. When examined with the ophthalmoscope they appear as yellowish, indistinctly outlined spots which lie beneath the retinal vessels. The overlying retina is clouded and gray. The vitreous is usually slightly turbid although not as pronounced as in syphilis. These exudates soon disappear leaving an atrophic choroid. If complete atrophy occurs the spot is white from the white sclera shining through. Later there is a proliferation of pigment so that these spots appear lined with black pigment or covered with black spots. These lesions are then characterized as cicatrices of the choroid. On account of the close proximity of the retina there is frequently an associated lesion of the retina producing a chorio-retinitis.

Tuberculosis of the retina produces either tubercles or periphlebitis of retinal vessels. Small miliary tubercles are found in the macular region. Larger tubercles either solitary or coalesced may be found anywhere in the retina. The tubercle is usually yellow and surrounded by a halo of edema in the early stage and pigment later. A periphlebitis associated with hemorrhages into the retina is a very characteristic tuberculous condition. The exudates are yellowish and gray. They are seen most frequently at the points of crossing of the arteries over the veins and at the bifurcations of the veins.

Tuberculosis of the optic nerve is rare.

Diabetes: The two most frequent eye complications of diabetes are retinitis and cataract. There is considerable disagreement in the literature as to whether or not there is such a thing as diabetic retinitis. Many authors claim that

diabetic retinitis does not exist. They stress the fact that diabetic retinitis never occurs in children. In adults they claim the retinal changes are due to vascular or renal pathology. When there are neither clinical nor laboratory signs of either vascular or renal disease in a case of diabetes with retinal changes these authors attribute the changes to a slowly developing chonic nephritis. However, the great majority of authors claim that there is such a condition as diabetic retinitis and that it can be differentiated from a retinitis due to renal or vascular disease. In diabetic retinitis the exudates have sharp edges with a soapy or waxy appearance. The exudates are smaller in size than in renal retinitis. The star figure in the macular region is rare in diabetic retinitis but frequent in albuminuric retinitis. In diabetic retinitis there are no soft edge cotton wool patches, and no retinal edema. Hemorrhages are frequent in diabetic retinitis. They usually occur in the deeper layers, hence they are circular, and frequently they rupture the hyaloid and diffuse into the vitreous.

In young people diabetic cataract is usually bilateral. It begins in the posterior cortical layer, and develops rapidly. In elderly people it is difficult to differentiate a diabetic cataract from other types. It usually begins in the anterior cortical layer and develops rapidly.

Other eye complications of diabetes are optic neuritis, palsies of the ocular muscles, changes in refraction, iritis, vitreous opacities, optic atrophy, thrombosis of retinal vessels, changes in the color of the retinal blood, retrobulbar neuritis, and hemorrhagic glaucoma.

Nephritis: The outstanding eye complication of this disease is albuminuric retinitis. The pathological changes are due to exudates, hemorrhages, and edema. In the early stage the exudates appear as large, white, indistinctly outlined areas, usually located in the posterior portion of the eyeball. These are the so-called cotton wool patches. They are usually accompanied by hemorrhages both round and flame shaped. Later the exudates become smaller and their edges more sharply defined. Still later the exudates are completely absorbed leaving pigmentary changes behind. Often these exudates arrange themselves in such a manner that they form a star figure in the macular region. The star figure is not limited to albuminuric retinitis but may also appear in the retinitis of arteriosclerosis. Choked disc frequently accompanies the exudates.

Arteriosclerosis: During life there is no better place in the body than the eye to observe vascular changes. Arteriosclerosis first produces a sclerosis of the retinal arteries shown by an increase in brilliancy in the central light reflex. As the disease progresses the arteries become more rigid, the blood column becomes smaller and the arteries seem to be contracted. They then compress the veins at the crossings. The terminal arterioles become very tortuous, resembling corkscrews. As the disease advances still farther the caliber of the main arteries begins to vary in size. Later the blood column becomes very narrow and the walls of the vessels become streaked with white, producing the so-called pipe stem sheathing. Small round also flame shaped hemorrhages occur in the retina. The hemorrhages may be accompanied by whitish or yellowish exudates. The exudates and hemorrhages are usually small in size and located near the macular region.

Multiple Sclerosis: The principal eye complication of this disease is retrobulbar neuritis. On ophthalmoscopic examination there is found to be pallor of the inferior temporal quadrant of the disc. Frequently only one eye is involved. The pallor never progresses to a complete optic atrophy. Usually there are marked defects of vision, but complete blindness never occurs. The most frequent field defects are central scotomata and contracture of the upper temporal field. Sometimes the pupils are of unequal size. In the later stages of the disease myosis is common. Almost any combination of paralyses of the extra-ocular muscles may occur, but the most frequent is a unilateral or bilateral external rectus paralysis. Nystagmus is nearly always present.

Epidemic Encephalitis: Epidemic encephalitis produces some unusual eye complications. Paroxysmal spasmodic deviations of the eyeballs occur either upward, downward, or laterally. The eyes become fixed in one plane frequently with a fluttering or an enforced closure of the eyelids. A roll-like motion of the eye may be elicited when a patient is placed in a darkened room and a concentrated light beam is directed toward the eyes. Various paralyses of extra-ocular muscles have been noted. A great variety of pupillary signs have been described in cases of epidemic encephalitis. Argyll-Robertson pupil occurs fre-

quently. If anisocoria occurs it may be long-lasting or temporary. The ability to converge the eyes is frequently lacking.

Diseases of the Accessory Nasal Sinuses: Diseases of the nasal accessory sinuses may act as a focus of infection for an iritis, iridocyclitis, or possibly a chorio-retinitis. A small percentage of the cases of retrobulbar neuritis are due to sinus disease, the far greater percentage being due to multple sclerosis.

Basal Lesions of Frontal Lobe: Basal lesions are found in 15 per cent of all frontal lobe tumors. If the basal lesion is unilateral it produces certain changes in the eyes which collectively are known as the Foster Kennedy syndrome. This syndrome consists of central or cecocentral scotomata with optic atrophy on the same side as the lesion; and normal vision with a choked disc on the opposite side. The optic atrophy on the same side as the lesion is not present in every case as sometimes the disc is normal, pale, or choked.

Brain Abscess and Tumors of the Brain: These diseases produce a great variety of combinations of ocular changes depending on their location in the brain. The changes are principally field defects, paralyses of extra-ocular muscles and either choking or atrophy of the disc.

Trichinosis: In this disease there is sometimes redness and swelling of the bulbar conjunctiva overlying the external and internal rectus muscles. There may also be an edema of the lids. Movement of the eyes produces pain due to the involvement of the extra-ocular muscles of the eye along with the other muscles of the body by the trichinæ. Other ocular lesions sometimes noted are exophthalmos, conjunctival ecchymosis, midriasis, and retinal hemorrhages both superficial and deep.

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THE TREATMENT OF EPIDERMOPHYTOSIS*

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EPIDERMOPHYTOSIS or trichophytosis has become increasingly common during the last decade. In private dermatologic practice it ranks with eczema and acne in the incidence of cases seen. In a large dispensary practice such as that of the New York Skin and Cancer Hospital, from 1913 to 1927, epidermophytosis was ranked seventh or eighth in order of frequency of diseases noted, whereas in 1928 and 1929 the condition had progressed to second place. In many instances the presence of infection is discovered in the course of routine examination of the patient for other reasons. These dormant cases are none the less important from the standpoint of public health. Examination of students in universities discloses an increasing incidence of ringworm year by year; it has been stated that 70 per cent of senior medical students have epidermophytosis.

The clinical picture is definite. The sites of predilection are the webs between the toes, the nails, the plantar surfaces, and less frequently the groin, the hands, and the glabrous skin. The morphologic characteristics are determined to a large extent by the nature of the soil. In the presence of hyperhidrosis the picture is chiefly intertriginous, with scattered vesicles which have a tendency to coalesce. Where the skin is dry, the keratotic manifestations predominate.

To distinguish properly ringworm of the feet from other dermatologic affections, it is essential that the fungus be demonstrated. Identification of the organism is usually possible by examining scrapings, scales, or macerated tissues in a 10 per cent solution of potassium hydroxide. The nails require a stronger solution for a longer period of time. When vesicles are present, it is customary to decapitate a vesicle, invert it on a slide, and cover it with the solution of potassium hydroxide until the epithelial débris is sufficiently digested. The mycelial filaments are best seen in the microscopic field in diffused light. Cultural methods find their chief value when it is desired to distinguish the species of fungi, and are not of great practical value.

The remedies that have been prescribed for treatment of epidermophytosis are legion; their very numbers bespeak their inadequacy. To prove the fungistatic power of drugs on cultures of fungi does not necessarily demonstrate their fungicidal capacity in regard to the infection in tissues. A favorite standby is Whitfield's ointment, a combination of benzoic and salicylic acids, which is probably beneficial by reason of its exfoliative action. Thymol and the essential oils of clove and cinnamon have been recommended on the basis of fungistatic tests on culture. However, they have not found much practical application. Iodine in solution in benzol or acetone, in weak dilution, is very efficient. Recent research has indicated that certain mercurial compounds, mercury fuchsin and mercury crystal violet, are highly fungicidal as compared with the more popular but weak mercurochrome. A specific fungicidal remedy is not yet at hand, certain advertisements to the contrary notwithstanding.

During the acute vesicular stage of the infection, it is best to rely on the application of mildly antiseptic and soothing compresses and soakings, of which potassium permanganate, copper sulphate, and preparations of aluminum subacetate are most popular. In the more chronic stages, the use of occasional wet dressings will offset

*From the Section on Dermatology and Syphilology, The Mayo Clinic, Rochester, Minnesota. Read before the Minnesota State Medical Association, St. Paul, May 24, 1932.

the irritating effects of the exfoliants and antiseptic chemicals. If there is considerable hyperkeratosis, Whitfield's ointment in full strength should be used, or a solution of salicylic acid in alcohol. Attention to the nails is most important.

Roentgen rays are employed not infrequently in practice, but their use should be controlled by experts. It is not unusual to see instances of actinodermatitis with evidence of active ringworm infection remaining in the same field. Roentgen rays find their chief application when there is marked hyperhidrosis, and a drying effect is desirable.

In the effort to develop more efficient fungicidal preparations, too little attention has been paid to the matter of prophylaxis and of prevention of recurrence or of reinfection. It is common experience that a particular form of treatment will not apply equally well to a number of patients, nor at different times to the same patient. The problem of individual predisposition is governed by factors often beyond the physician's control. Certainly obesity and hyperhidrosis favor warmth and moisture, which facilitate the growth of the fungus. The hydrogen-ion concentration of the sweat may account to a certain extent for individual differences in patients. The frequent application of soap and water, followed by a mild dusting powder, such as 20 per cent sodium hyposulphite in powdered boric acid, sprinkled in the hose, will serve to control a large percentage of the milder cases. Frequent changes of hose, as well as thorough drying of the shoes, are simple details which are readily overlooked. A period of mild treatment before the onset of warm weather is a most efficient preventive.

Wherever crowds of people gather to make use of public bathing facilities, the incidence of infection is usually increased. The use of tanks of sodium hypochlorite solution in a strength of 0.5 to 1 per cent has recently been proposed for rinsing the feet before and after bathing. The method is practical and successful to a high degree in prevention of epidemics.

Complications and systemic reactions to infections of the feet with Epidermophyton are not infrequent. Often the adjacent lymph nodes are enlarged and tender. Not infrequently there is phlebitis or cellulitis, with ascending lymphangitis. These may be due to the fungus or to secondary invasion by pyogenic organisms through the fissured skin. The fungus has been obtained in culture from infected lymph nodes and from the blood.

If the infection has been present for a time, a state of hypersensitivity may develop, characterized by the appearance of epidermophytids. These are systemic reactions which appear following hematogenous dissemination of the organism or its products to the sensitized skin. One sees vesicles on the palms and along the borders of the fingers, which are likely to be epidermophytids. Search in solution of potassium hydroxide for fungi is repeatedly negative when the specimens are from the hands, whereas microscopic examination of scrapings from the feet are positive. At times secondary manifestations overshadow the primary focus. Often the sites of infection, especially when on the hands, become exceedingly reactive to various external agents, such as soap, water, or materials used in various occupations, with resulting secondary dermatitis. In such cases the very mildest and most soothing remedies are to be recommended.

Extract of fungus, trichophytin, will provoke a positive dermal reaction in sensitized persons, both on intradermal injections and on application in a patch. The use of trichophytin has been advocated as a method of desensitization, but results so far have not proved encouraging.

A judicious program of treatment will include the best of the procedures mentioned, persistently applied. The most efficient fungicides alone, without recognition of the problem of prophylaxis and individual hypersensitivity, will fail to accomplish control of epidermophytosis.

CASE REPORTS

SUBCUTANEOUS RUPTURE OF THE URETHRA AND CORPORA CAVERNOSA

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During intercourse, the patient, a married man, aged fifty-six, felt, as he expressed it, that something had gone wrong. He found himself bleeding from the urethra and the penis was rapidly swelling. There was no particular pain noticed. His past history was essentially negative.

The patient was examined by Dr. Rose, who gave a diagnosis of urethral rupture, and taken to the hospital immediately. Upon examination the penis was found to be markedly swollen, discolored and cold. Subcutaneous hemorrhages extended to the scrotum and there was bleeding from the urethra. About 5 cm. behind the corona of the glans there was an acute posterior angulation.

Under general anesthesia an incision was made on the under surface of the penis parallel to the urethra and over the area of maximum swelling. The urethra was found nearly torn in two, at a point some 6 or 7 cm. from the anterior meatus. The corpus cavernosum was also ruptured, its tissues filled with blood and a clot the size of a walnut was expressed.

The torn urethra was sutured and a retention catheter inserted. This was removed the third day, after which the patient was able to urinate normally. The wound healed without infection developing. This was doubtless due to the fact that the patient was seen and treated immediately before any attempt had been made to urinate and before catheterization had been attempted.

GAS BACILLUS INFECTION TREATED BY POLYVALENT SERUM

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A married woman, aged fifty, sustained extensive lacerations of the right leg from broken glass in an automobile accident, May 27, 1932. The wounds were somewhat contaminated by dirt and debris. She received first aid treatment and the wounds were sutured before she was brought to the hospital.

The patient was put to bed, the leg was elevated and antitetanic serum given. The next morning there was considerable swelling at the site of the injuries, and those stitches under tension were removed. The following morning the leg was so swollen and painful that all the stitches were removed and Dakin's solution applied to the open wounds. The following day there was evidence of gas bacillus infection. The leg was edematous and crepitus was elicited on pressure. Both wound margins were black or a dirty gray and had a cooked appearance for an extent of two or three inches. A foul odor was noticeable. The patient was dull and toxic and complained of a great deal of pain in the leg. The temperature was 102.8 degrees; the pulse 118.

The wound was laid wide open and enough of the dead tissue removed to obtain free access to all areas of infection. The debridement was carried out under a light general anesthetic and tissue showing the presence of circulation was not molested. This resulted in a loss of skin and subcutaneous tissue 12 to 18 cm. in width completely encircling the leg above the ankle. Ninety c.c. of the unrefined polyvalent gas bacillus serum (Lederle) was given intravenously. About an hour later a rather severe chill occurred but the temperature dropped from 102.8 to 98 degrees and the pulse from 130 to 90.

The following afternoon the temperature was 100 degrees and the pulse 100. Thirty c.c. of the refined polyvalent serum was given subcutaneously and repeated in twelve hours and again in another twenty-four hours—four doses in all.

Improvement following the serum administration was as remarkable as that seen following the use of diphtheria antitoxin. The general condition of the patient immediately improved and the infection made no further progress. The gas formation ceased after the first dose of the serum.

The patient made an uneventful recovery and left the hospital after seven weeks. The denuded area was later covered by skin grafts.

The case illustrates the very satisfactory results occasionally obtained from use of the polyvalent gas bacillus serum and shows the danger of early suture of infected wounds.

RETROPERITONEAL MYXOLEIOMYOMA*

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The patient, a man twenty-six years of age, had had, in December, 1929, a thyroidectomy for an exophthalmic goiter. Convalescence had been uneventful. A physical examination at that time revealed the presence of no abnormal masses in the abdomen.

He returned for examination in May, 1930, because of a persistent distress in the epigastric region, which at irregular intervals had been fairly severe. This pain was not related to eating or to bowel function, and

*Presented before Minneapolis Surgical Society, October 6, 1932.

likewise was not associated with any symptoms referable to the genito-urinary tract. Relief was obtained only from the use of increasing amounts of various mild sedatives. There had been a loss of a few pounds of weight, but this he attributed to worry and consequent poor appetite.

Physical examination showed an essentially normal, healthy appearing adult. Except for a hard rounded fixed mass in the left portion of the abdomen, slightly above the umbilicus, there were no abnormal findings.

The hemoglobin concentration of the blood by the Dare method showed it to be 80 per cent of normal. The urine showed no findings of note and microscopic examination of a smear of the blood revealed no unusual type or number of cells. Roentgenographic and fluoroscopic study of the gastro-intestinal tract showed the transverse colon upwardly displaced by the tumor, but otherwise gave no further information as to the nature of the mass.

Exploration on May 12, 1930, through a left rectus incision, disclosed a large cystic tumor, situated retroperitoneally just below the ligament of Treitz. It was fairly well encapsulated and was removed completely without breaking into the mass.

Convalescence was without incident and the patient left the hospital on the fifteenth postoperative day. The patient was heard from in August, 1932, two years and three months after the operation, and was entirely free from recurrence, as far as could be determined.

Pathological examination was made by Dr. E. T. Bell of the University of Minnesota and was reported as follows: "The specimen is an encapsulated tumor, measuring 16 by 8 cm., composed of soft gelatinous looking material, yellowish pink in color, and oozes bloody serum. In the center are two hard masses of tissue each about the size of a walnut. Sections made for microscopic study show masses of involuntary muscle fibers with myxomatous degeneration. Diagnosis: myxoleiomyoma."

Fig. 1. Photomicrograph of tumor (low power). Note myxomatous structure as well as smooth muscle bundles.

Fig. 2. High power. Large amount of mucinous material in association with myomatous areas.

COMMENT

Tumors of the retroperitoneal region are of indefinite origin. The symptoms produced are vague and laboratory examinations are of no value; consequently, their diagnosis is fraught with difficulty. In about a third of these cases, the kidney capsule gives origin to these tumors, according to Judd and Larson,[2] while in the remainder, no structure can be implicated from even a careful study of the tumor or its surroundings. Pathologically, the structure of these neoplasms varies within wide limits from that of a simple benign lipoma, fibroma, myoma or myxoma, to that of the metaplastic highly malignant sarcoma. Various combinations of cell types are frequently present, such as lipomyxosarcoma, chondro-osteosarcoma, etc. Metastases take place in about a third of the cases and occur most frequently in the lungs, liver and regional lymph

glands. These neoplasms are most frequently confused, clinically, with renal, splenic, liver or ovarian tumors and occasionally with a mesenteric or pancreatic lesion, as was done in the case reported above. Colonic and other intestinal neoplasms must be considered in the differential diagnosis of this condition.

The treatment of choice of this type of tumor is surgical removal. Too frequently, however, because of its size or attachment to blood vessels, ureters, intestine or other structures, excision is impossible. In these cases, radiotherapy may be of some benefit. In the operative removal of the tumor, wide resection is imperative, because of the marked tendency of these neoplasms to local recurrence. This is particularly true if the lesion contains any myxomatous structure, since material of this kind is especially prone to adhere to anything with which it comes into contact. Furthermore, it is also important to search for and to remove all smaller nodules which may be and occasionally are present alongside the main tumor mass (Judd and Larson).[1] The prognosis is good when the entire neoplasm can be removed, such as in the preceding case. When this is not possible, therapy with radium and roentgen ray offers hope of palliation and possibly of cure, depending on the degree of malignancy of the tumor.

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"A DUCK," SAID THE DOCTOR— "QUACK," SAID THE DUCK

This morning (ten days ago to you) we wave farewell to the valiant huntsmen who start forth in high spirits to capture the hostile duck. To many minds there is some question as to which is the more interesting bird—the duck hunter, or the duck. Each year the duck, bidden by some mystic call, leaves its comfortable summer home in the North to start its migratory flight southward. Whether they put their children in school in the South and spend their vacations in the North, or vice versa, is a point in natural history unknown to this ornithologist. It is a well known fact, however, that they start their trip each year just in time to give the Bronx cheer to the duck hunters who make annual journeys into the country to wave queer, hollow, smoking sticks at them when they go by.

The life history of the duck is very interesting. No doubt if more were known of it, it would equal in interest the habits of the duck hunter. It is not unreasonable to suppose that the ducks in their summer convention assembled were told of the coming eclipse and asked for the sake of science to observe and record the actions of hunters when the light of the sun was mysteriously obscured by the moon.

Accurate study of either ducks or hunters is tremendously handicapped because we can't understand the ducks and we can't believe the hunters. For example, many hunters tell us that they are actuated by a love of the beautiful out-of-doors in the autumn. Surely, appreciation of clear frosty air, brilliant foliage, and October skies is a great thing, but what actually happens? Our group of nature loving nimrods travel in droves of stinking cars over tarred roads to arrive in the evening at a suitable place—often designated as a hunting lodge. Until late in the night they sit around playing games of chance, drinking poisonous whiskey, smoking vile cigars, and telling stories entirely unfit for the drawing room. At four o'clock in the morning they roll out of their uncomfortable bunks. Shaking, shivering, snorting, swearing, stamping, and slapping, they pull on their boots and breeches to go to a still more uncomfortable place. Most any cold, dark, damp, disagreeable reedy recess that is half under water will do. Here they sit with their teeth chattering until rosy fingered dawn doth with a shaft of light the first duck point out.

Sometimes these hunters bring home ducks. Often, all they get is the above mentioned Bronx cheer from the web-footed enemy. No one outside the guild can really tell what goes on when hunters go hunting. With such meager knowledge it would be very unreasonable indeed for us to criticize them. We don't. If we are invited to a duck-hunter's house for dinner this fall we will accept with alacrity and will be very happy to sit down and eat our pheasants without a word.

Many doctors are duck hunters.—*Bulletin Hennepin County Medical Society, Oct. 10, 1932.*

THE B. & M. CASE

On July 19, 1932, in the Federal District Court, Baltimore, a flagrantly fraudulent "patent medicine" known as "B. & M." was declared misbranded. B. & M. Remedy is marketed from Boston by the F. E. Rollins Company. It is a simple liniment of, essentially, turpentine, ammonia and egg. The stuff has always been sold as a remedy for such serious conditions as tuberculosis, pneumonia, influenza, and a number of other pathologic states. In the case that has just been decided, the government brought suit against the F. E. Rollins Company, by way of seizure of this firm's goods, of false and fraudulent claims for therapeutic effects made for the preparation in a booklet issued by the company. This booklet was stated to have been prepared and much of it written by Dr. Herbert D. Pease of the Pease Laboratories, New York City, and according to the uncontradicted testimony in the case the firm had paid Pease $15,000, for which he was to revise their literature and give it a "scientific" background. The two outstanding features of the case were, first, the fact that it has been possible for years to sell broadcast to a particularly unfortunate group—the tuberculous—a fantastic fraud that does not have even the plausibility of ignorance in its favor, and that it was necessary for the United States government to spend thousands of dollars and expend untold effort to have it legally ruled as a fraud; second, is the outstanding spectacle of a Fellow of the American Medical Association selling his services to the exploiters of what is a self-evident fraud; and, greatest irony of all, for more than a quarter of a century the American Medical Association has been the one, and practically only, agency that, year in and year out, has endeavored to protect the public against just such frauds as B. & M. (Jour. A. M. A., August 13, 1932, p. 578.)

PRESIDENT'S LETTER

RECENTLY I saw in a theater a motion picture which depicted the sad predicament of a crippled child deprived of needed surgical services because there was no money.

There is no need in this land for anyone to go without necessary surgical treatment if a hospital bed is available in a charitable institution, or if funds are provided to defray the cost in a private institution of food, heat, nursing, bedding and so forth. The inference of the motion picture mentioned was that members of the medical profession would not give of their skill unless the fees were assured. Nothing could be more untrue. Society never even considers that the grocer, the fuel merchant, and others should donate of their wares to the hospital as does the doctor who gives so freely of his wares; namely, his skill and time. This public criticism, for in our eyes it amounts to such, of our profession that one sees so often on the screen and reads in books is probably not taken seriously by the authors except so far as it makes the job of building up his narrative easier. If it were possible to compute the commercial value of the medical services rendered free to the public the sum would be so stupendous as to cast all other sums given for charity in the shade.

Industrial activities, in spite of erratic and uncertain periods of employment, have called more and more of our people to their lists. Also in many places owners have relinquished their farms to renters, and this has produced in rural districts, in this day of low prices for agricultural products, a body of citizens comparable with the employes of industry. From these two groups come many of the indigent sick. These, with a large number from other walks of life, in fact threaten the very existence of our method of practice of medicine. This condition of affairs calls for deep consideration and study by our organized medical bodies. Our secretary, Doctor Meyerding, is gathering much data about the care of the indigent sick, and it will be brought before the proper committees of our state society. In some sections of our own state, and in various other states, efforts have been made, and apparently with success, to bring about a sensible understanding with the authorities concerning the care of the needy sick. There is absolutely no reason why the medical profession should not be paid by the community a fair and equitable fee for their services to the poor. In some instances in which an understanding has been reached the county medical society has agreed to provide the medical services, the income being devoted to payment of dues to state and national societies, to the bringing of lecturers for graduate instruction, to the maintenance of a medical library, and so forth. The sooner organized medicine works out some sound, concrete plan flexible enough to fit varying local conditions the better for all concerned, including the needy patient, the taxpayer, and the physician.

M. L. Henderson.

President,
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EDITORIAL

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HYPERPARATHYROIDISM

In an article appearing on another page, a clinical entity is described, which is new, in the sense that its recognition has come recently. The pathogenesis of this condition is established and its arrest or cure has been effected.

Von Recklinghausen recognized the skeletal deformity, osteitis fibrosa cystica generalisata, and some relationship between this and the condition of the parathyroid glands was suspected, in 1904, by Askanazy. It remained, however, for Mandl, in 1925, to disclose the exact relationship and to effect the arrest of the disease by the removal of a parathyroid tumor. The reports of many other cases, similarly benefited, have followed, as well as the experimental reproduction of the condition by the injection of active extracts of parathyroid tissue.

The main criteria for the diagnosis of this disease are, first, the accompanying abnormalities in the metabolism of calcium and phosphorus, whereby a negative calcium balance occurs, and, second, the decalcification of the skeleton, with the replacement of bone by connective tissue. Multiple cysts develop in the bones, as well as giant cell tumors. The blood serum calcium is usually elevated several milligrams above the normal value of 9 to 12 milligrams per cent, while the corresponding figure for phosphorus is lower than normal and the excretion in the urine of both calcium and phosphorus is increased.

The roentgen appearance of the bones is diagnostic, provided the process is sufficiently generalized, but a localized or focal fibrocystic disease must be differentiated, as this is not accompanied by any disturbance of calcium metabolism and seems not to involve the parathyroid glands.

Generalized fibrous osteitis, as it appears in association with overfunctioning parathyroid tumors, and is produced experimentally by injecting Collips' extract, differs fundamentally from both osteomalacia and from the better known osteitis deformans (Paget's disease). In osteomalacia the decalcification of the skeleton is more uniform, the overgrowth of connective tissue, in the bone, is not much in evidence, hypercalcemia does not occur and the calcium balance is rarely affected. Endemic in the Orient, rare in Europe and America, preëminently affecting pregnant women, osteomalacia is now known to result from deficiencies, either of calcium or Vitamin D, and thus to be intimately related to rickets. Some general hypertrophy of the parathyroids may accompany it, but no actual tumors are seen, as in hyperparathyroidism.

Paget's disease and leontiasis ossea, in the past, have been grouped with von Recklinghausen's generalized fibrocystic osteitis in a category called osteitis fibrosa. This was incorrect and is now confusing. The pathogenesis of Paget's disease (osteitis deformans) and that of leontiasis ossea remain obscure and undoubtedly differ from that of the generalized fibrocystic disease of von Recklinghausen. The roentgenographs of the skeleton in Paget's disease bear a superficial resemblance to those of hyperparathyroidism, but differ in many particulars, as is especially noticeable in the shafts of the long bones. The bone cortex is usually thickened in Paget's disease, in contrast to the thinner than normal bone cortex in the fibrous osteitis of hyperparathyroidism.

There is nothing abnormal either in the serum values for calcium and phosphorus or in the excretion of calcium, in Paget's disease. There is no evident abnormality in the parathyroid glands and parathyroidectomy is without benefit, in contrast to the immediate subjective and objective improvement after the removal of parathyroid tumors in cases of hyperparathyroidism.

R. M. W.

SMALLPOX VACCINATION

The most outstanding example of successful prevention of disease through vaccination, a method confirmed by repeated world-wide experience of more than a century, is furnished in the case of vaccination against smallpox. Yet the public, and we may well add the medical profession, must needs be periodically prodded in order that protection against one of the world's worst epidemic diseases be maintained.

The medical profession would be remiss if it did not call the attention of the public from time to time to the importance of vaccination. Some are of the opinion that the medical profession should sponsor legislation requiring universal vaccination of school children. No doubt the enforcement of such a law would practically eliminate the disease. It has been demonstrated that compulsory vaccination saves lives, but, after all, the individual can protect himself against smallpox if he will. While compulsory smallpox vaccination would be salutary to any community there are those who question the advisability of advocating settlement of medical problems by legislators.

That group of individuals, the anti-vaccinationists, whose reasoning processes are so distorted for one reason or another that they see only the occasional accident resulting from vaccination and forget what a dreadful disease smallpox is, continues to be a thorn in the flesh of the physician—especially the one interested in public health. It is true that in rare instances people have died or become gravely ill following vaccination, as well as from other superficial abrasions. In recent years improper care of vaccinations has been responsible for most, if not all, secondary infections. Sight seems to have been lost of the fact that hundreds of thousands have died of smallpox and more have been disfigured by the disease for life.

Osler's inimitable challenge merits quoting:

"I would like to issue a Mount Carmel-like challenge to any ten unvaccinated priests of Baal. I will go into the next severe epidemic with ten selected vaccinated persons and ten selected unvaccinated persons. I should prefer to choose the latter—three members of Parliament, three anti-vaccination doctors (if they could be found) and four anti-vaccination propagandists. I will make this promise, neither to jeer nor to jibe when they catch the disease, but to look after them as brothers, and for the four or five who are certain to die I will try to arrange the funerals with all the pomp and ceremony of an anti-vaccination demonstration."

The article on smallpox and vaccination by Dr. Westman in this number of the journal furnishes further statistical proof of the value of vaccination, and is a direct answer to false claims of local antivaccinationists. It stresses the need for repeated vaccination, a necessity many of us have not perhaps fully appreciated. A third of the school children throughout the state unvaccinated means the scene is already set for a return of a virulent epidemic of smallpox at any time.

THE PHYSICIAN AND POLITICS

The political campaign which is drawing to a close, although rather lacking in color, has aroused more than the usual amount of interest, coming as it does after three years of economic depression. There has been much talk and speculation as to the causes of the slump in business and naturally the political party in power has been blamed. That a change in party control in Washington would be a natural outcome has been generally predicted. It is probably a fact, however, that the past three years have been simply a phase in the cycle of economic adjustment of supply and demand such as has followed other wars.

We have learned about a "Hoover for president" organization of doctors. We also heard about a physician who on leaving for Europe notified his patients that if the fees owed him were not paid by the time he returned he would vote for Hoover; and that the fees were all paid.

There seem to be no clear-cut medical issues involved in the party planks. The interests of physicians are essentially those of the average citizen—the stimulation of business and the lowering of taxes. We have frequently expressed our belief that the government should not undertake activities which can be handled by private initiative. We as physicians can sympathize with others whose fields have been needlessly invaded by the government in competition. Government expense has mounted out of all proportion to increase in population, with the result that taxation has become unbearable. With these fundamentals in mind we approach the casting of the ballot. Fortunate it is that the majority of voters will feel the psychic uplift of the outcome, whichever party wins.

MISCELLANEOUS

SOCIAL INSURANCE

EDWARD H. OCHSNER, M.D.
Chicago, Illinois

COUNTER-SUGGESTIONS

The medical and dental professions of this country are giving the American public the best all-round health services ever enjoyed by any nation and are on the whole serving the nation as well or better than any other group of men. These two professions have a very general and most intimate contact with the citizens of the nation. No other professions are in so favorable a position to exert so great an influence for good as are these two if they will but use their opportunity rightly and wisely. If they are to accomplish the greatest possible good they must make still closer contacts with and exert still greater influence upon the political, social, and ethical life of the nation. These professions as a whole and as individuals must strive unceasingly and untiringly, in the future as in the past, for still further improvements in their respective fields. If unhampered by lay bureaucratic supervision and control in the future as they have on the whole been in the past we have every assurance that they will proceed to new and greater achievements; if, on the contrary, unduly hampered, we have every reason to expect medical service to deteriorate and medical progress to cease as it has already done in those countries whose governments have interfered the most.

In order to maintain the high standard of medical services prevailing, the professions must insist that the governments of the various states maintain high standards of requirements for admission to the practice of the professions. In order to accomplish this, continued education of the public in this regard is necessary.

The organized professions through their proper local organizations must see to it that all undesirables are weeded out and that the individual members render efficient service for adequate and yet reasonable fees. The professional man who makes unreasonably exorbitant charges for his services is even a greater menace to private practice than is he who charges too little. The former is the one to blame for most of the antagonism and resentment among the laity, while the latter because of his unfair competition makes it difficult for his colleagues to secure the necessary means for graduate work so essential to growth and progress.

Having presented to the attention of my readers through these articles the defects of Social Insurance as practiced at present in foreign countries and also having shown the dangers of such a system if allowed to become fixed upon the American Citizen, I offer as counter-suggestions that the government instead of wanting to take over new functions and new powers would do better were it to make every effort to perform acceptably the duties with which it now is entrusted. We of the medical and dental professions insist that the government give better medical services to its prisoners, delinquents, insane, paupers and government wards in general; that it give more serious attention to sanitation and hygiene, particularly to ventilation of public conveyances and places where large numbers of people congregate, and to the prevention of pollution of our sources of community water supply such as lakes and rivers.

The allied professions in conjunction with the government should give more serious attention to the teaching of personal hygiene in our schools, colleges and universities. Our educational institutions should teach the rising generation the value of integrity, industry, thrift and frugality, and that there is no substitute for these, not even legislation. Teach them that trying to keep up with the Joneses is not necessarily a virtue and that the installment buying of luxuries and trying to keep ahead of the Browns is poor business. Teach them that to learn how to get one's money's worth and to acquire a competence are much more worth while. Teach them that trying to get something for nothing, particularly through gambling, whether it be crap-shooting, poker, or buying stocks on margin, is fundamentally dishonest and almost invariably leads to disaster.

Better provisions for safeguarding the savings of our workers should be made and if there is no way of accomplishing this, there should be established a compulsory government insurance against sickness whereby the individual worker pays for his own insurance; in other words, separate entirely medical services and cash benefits. The physician should under no circumstances be medical advisor and insurance adjuster as he is in fact in all systems of Compulsory Health Insurance now in vogue.

Social Insurance is man's latest attempt at finding a means whereby social justice may be attained. But like all panaceas so far advanced it is sure to make conditions worse rather than better. The first and most important thing to do is to secure honest and efficient government and this cannot be accomplished until the general standard of honesty has greatly improved, which is simply another way of saying that there is no substitute for character of the individual members which make up a nation.

Finally, devise means and methods whereby remuneration and reward shall be in direct proportion to time and energy legitimately expended and to the value of services rendered to society.

While the underlying purpose of Social Insurance is to secure the more equable distribution of wealth and to employ the weapon of taxation in order to secure the necessities and comforts of life to the poor at the expense of those with larger incomes, the system is of necessity a failure because it does not conform with the foregoing fundamental principle of justice, but instead, rewards the inefficient at the expense of the efficient; the lazy, shiftless and immoral at the expense of the industrious, thrifty and moral. While it is unquestionably true that certain individuals have been and are still receiving money for which they have not rendered an equivalent service to society, trebling and quadrupling and even ten-fold the number of these parasites does not correct the evil. The remedy must be much more fundamental.

This formula will require the best brains of the country for its practical application, but I am firmly convinced that it is the only formula that offers a practical solution to our social and economic ills not only of the allied professions but of society in general. If it is followed those members of society who are doing the world's work will have enough money to employ capable dentists and physicians of their own choice and will then be assured adequate health service.

TILTON FOUND GUILTY

Lester Tilton, notorious and aggressive promoter of a nostrum for cancer, was found guilty of conspiracy to violate the medical practice act of the state of Illinois. Similar verdicts were also brought by the jury against two co-defendants who aided Tilton in his quackery, Harry de Joannis, a promoter, and Joseph Duffy, a licensed physician. Tilton's activities have long been a stench and a disgrace to the middle west. Tilton's "cancer cure," like practically every other humbug of the type, is an escharotic with zinc salt as the active ingredient in a base of peat as the "mystery" element. (Jour. A. M. A., July 2, 1932, p. 38.)

A FORUM OF THE COMMITTEE ON PUBLIC HEALTH EDUCATION

There are many physician economists who believe that America will not emerge from this depression without the inauguration of some system of health insurance or some form of social medicine comparable to the systems that have been tried with varying success in European countries.

It is of tremendous significance and importance to the doctor and the layman, too, that the American Medical Association should be alert to the tendencies of the times and prepared to take an authoritative position on behalf of the medical profession. In witness of that readiness, an important study by R. G. Leland is now ready for early publication in the Bulletin of the American Medical Association. Dr. Leland is Chairman of the Medical Economics Committee of the American Medical Association. His paper is a résumé of all essential points, together with criticisms of all existing schemes for furnishing medical treatment to the poor, to special classes, to industry either free or upon the installment basis.

This paper will be of tremendous interest to every physician in every county society and state association in the country where experiments are being tried or are in contemplation for the solution of some of the baffling current problems of medicine. It is, in no sense, a sweeping condemnation of such experiments, as deplorable departures from the traditions of medicine. On the contrary it is a grave consideration of all of them to discover what is good in them as well as what is bad.

It definitely foreshadows constructive action on the part of organized medicine itself, instead of on the part of insurance companies, or government bureaus looking toward adjustments which shall not sacrifice the essentials of freedom from lay interference.

Following is a part of Dr. Leland's conclusion which, together with the entire paper, should have the serious attention of every society and every physician.

EFFECTS OF GENERAL ECONOMIC DEPRESSION ON THE MEDICAL PROFESSION

"It is impossible to determine the extent to which the incomes of physicians have fallen to or below the commonly accepted amount necessary for the American standard of living. Sufficient evidence is available to show that not only have incomes dropped to an unprecedented low point but the financial insecurity caused thereby has apparently also resulted in a sort of mental panic and physicians appear to be willing to embrace almost any scheme which holds out promises of a more definite financial return.

The following statements, therefore, seem justifiable, if not self-evident:

"1. Large numbers of physicians are now receiving bare subsistence incomes.

"2. Stress of financial worries operates to distort clear thinking and careful planning on plans for medical care.

"3. Immediate financial relief to the medical profession in times of general economic depression is likely to be given more serious consideration than measures for ultimate sound adjustment.

"4. During periods of financial stress, opportunities frequently present themselves to disregard the principles of ethics and because of the exigencies of the moment to fall into undesirable and dangerous practices."

OF GENERAL INTEREST

At the October meeting of the Minnesota Academy of Ophthalmology and Otolaryngology, Dr. Harold J. Rothschild, St. Paul, was elected president.

The new Bethesda Hospital, St. Paul, was dedicated with fitting ceremonies Sunday, October 2. The hospital was erected at a cost of $500,000 by the Augustana Lutheran Church organization of Minnesota.

The marriage of Dr. F. J. Plondke and Miss Madeline May Bruchman took place Thursday, September 28, 1932, in St. Paul's Evangelical Church, St. Paul. Dr. and Mrs. Plondke are at home at 976 Summit Avenue, St. Paul.

Dr. Ragnar T. Westman, Chief of the Quarantine Division of the Minneapolis Department of Health, was married, October 4, 1932, in Minneapolis, to Miss Gladys Emilie Magiera, R.N. Both are residents of Minneapolis. Dr. Westman is a graduate of the University of Minnesota School of Medicine, and Miss Magiera is a graduate of the St. Andrews and University of Minnesota Schools of Nursing.

The title of Commendatore della Corona d'Italia (Knight Commander of the Crown of Italy) was conferred on Dr. William J. Mayo and Dr. Charles H. Mayo by His Majesty, the King of Italy, in recognition of their services to science and to humanity, and more especially in recognition of their kindness to Italian graduate students, studying at the Clinic, and to patients of Italian origin who are cared for in the Clinic. His majesty was represented by the Acting Royal Italian Consul, Cavaliere A. Castigliano. The ceremony was held in Plummer Hall, Saturday morning, October 22, at 11:00 o'clock. The professional and nonprofessional members of the staff and many other citizens attended the ceremony.

An unusually successful and valuable Short Course in Tuberculosis was held at the Southwestern Minnesota Sanatorium at Worthington, Friday, October 14, under the auspices of the Minnesota Public Health Association. Enrollment for the course, limited as always to twenty-five, was complete.

The morning program was devoted to papers by visiting clinicians: "New Development in the Diagnosis and Treatment of Tuberculosis," by J. A. Myers, Minneapolis; "Childhood Tuberculosis," by C. A. Stewart, Minneapolis; "X-ray Diagnosis of Pulmonary Diseases," by Leo Rigler, Minneapolis; "Differential Diagnosis and Treatment," by H. G. Wood, Rochester; "History and Symptoms," by S. A. Slater, Worthington; "Conditions Simulating Tuberculosis," by W. P. Ross, Worthington, and "Why Tuberculosis Short Courses," by E. A. Meyerding, St. Paul.

In the afternoon attending physicians were divided into small groups for examination of patients and consultation with the visitors.

In a report made before the American College of Surgeons in St. Louis, October 16, the following Minnesota hospitals were listed as approved by the College:

Minneapolis—Abbott, Asbury, Eitel, Fairview, Hill Crest Surgical, Lutheran Deaconess, Maternity, Minneapolis General, Northwestern, St. Andrew's, St. Barnabas, St. Mary's, Shriners' Hospital for Crippled Children, Swedish, University and U. S. Veterans'.

Saint Paul—Ancker, Bethesda, Charles T. Miller, Children's, Gillette, Midway, Mounds Park, Northern Pacific, St. John's, St. Joseph's, and St. Luke's.

Outside the Twin Cities—Naeve, Albert Lea; Douglas, Alexandria; St. Joseph's, Brainerd; Bethesda and St. Vincent's, Crookston; St. Luke's and St. Mary's, Duluth; More, Eveleth; George B. Wright Memorial and St. Luke's, Fergus Falls; Western Minnesota, Graceville; Adams and Rood, Hibbing; St. Gabriel's, Little Falls; Immanuel and St. Joseph's, Mankato; Nopeming Sanatorium, Nopeming; Glen Lake Sanatorium, Oak Terrace; St. John's, Red Wing; Colonial, Kahler, St. Mary's, and Worrell, Rochester; St. Cloud and Veterans', St. Cloud; Lakeview Memorial, Stillwater; St. Luke's, Thief River Falls; Warren, Warren; Willmar, Willmar; Winona General, Winona.

At a recent meeting in Chicago, the directors of Alpha Omega Alpha Honorary Medical Scholarship Society adopted the following resolutions in recognition of the eminent services of the late Dr. William W. Root, Slaterville Springs, New York, the founder of the society and secretary-treasurer since its organization in 1902:

1. That all stationery and official documents of the society bear the words, "Founded by William W. Root, 1902," and
2. That the annual lecture presented each year by a leading medical scientist be known as the "William W. Root Alpha Omega Alpha Lecture."

The present officers of the society are Walter L. Bierring, Des Moines, president; Austin A. Hayden, Chicago, vice president; Josiah J. Moore, 55 E. Washington Street, Chicago, secretary-treasurer. Mrs. Root will continue as assistant secretary.

In addition to the officers, the directorate includes Ray Lyman Wilbur, Washington, D. C.: Waller S. Leathers, Nashville; Louis B. Wilson, Rochester, Minn., and Willard C. Rappleye, New York City.

The committee on extension and policy comprises Elias P. Lyon, Minneapolis, chairman; William Pepper, Philadelphia; Irving S. Cutter, Chicago; Frederick C. Waite, Cleveland, and Thomas C. Routley, Toronto.

MINNESOTA STATE BOARD OF MEDICAL EXAMINERS

MASSEUR AND EX-NATUROPATH PLEADS GUILTY

State of Minnesota *vs.* Samuel C. Hoen

On September 19, 1932, Samuel C. Hoen, 278 Rondo St., St. Paul, Minnesota, entered a plea of guilty to practicing medicine without a license, before the Honorable John W. Boerner, Judge of the District Court for Ramsey County.

Hoen, a licensed masseur, had been treating one, Mrs. Hattie Shaughnessy, for cancer of the breast. The case was diagnosed by the defendant looking into the eyes of the patient; the ailment treated by the so-called galvanic current plus constipation pills. As a result of three months of treatment at the hands of this "grand old man," Mrs. Shaughnessy submitted to surgery.

In spite of a very eloquent plea by the pastor of the church attended by the defendant, for leniency, Judge Boerner, in no uncertain terms, denounced such treatment on the part of the defendant and sentenced him to one year in the St. Paul workhouse; ordered him to return the money obtained within thirty days and in addition thereto the defendant surrendered his massage license.

Hoen is listed in the 1925 city directory as a chiropractor and in the 1928 city directory as a naturopath. Hoen will be on probation for the next twelve months

and will have no license whatever to practice healing in the future.

ITINERANT PREACHER PLEADS GUILTY TO GRAND LARCENY

State of Minnesota *vs.* Walter H. Hawkins

On September 23, 1932, Walter H. Hawkins, sixty years of age, entered a plea of guilty to grand larceny in the second degree, before the Honorable F. W. Senn, Judge of the District Court at Mantorville, Minn. Following an investigation made by the Minnesota State Board of Medical Examiners, Hawkins was arrested at Northfield, Minnesota, on August 24, 1932, after his receiving $125.00 in cash from Mrs. Catherine Sammon at Faribault, who has been ill for some time. Mrs. Sammon, seventy-seven years of age, was persuaded by Hawkins to part with this money on the representation by Hawkins that he would give her divine healing via the absent treatment route from Chicago each evening for a period of six weeks; that such a course of treatment would effect a cure for Mrs. Sammon's ailment. Hawkins did not return to Chicago and upon the expiration of the six weeks period with no improvement in Mrs. Sammon's condition, Hawkins was placed under arrest. At the time of entering his plea of guilty, Hawkins had been confined in the Rice County jail for a period of thirty days and was given a one-year suspended sentence in the county jail of Rice County. Hawkins informed the Court that he was leaving at once for his home in Chicago. Hawkins is a licensed dentist in the State of Illinois. Hawkins admitted to the Court that he had been convicted of practicing dentistry wihtout a license in Chicago, and that he had been tried and found not guilty at Springfield, Illinois, of practicing medicine without a license.

Judge Senn informed Hawkins in a very emphatic way that such practices would not be tolerated in this State and that any complaint against him in the future would be very severely dealt with.

This is the first prosecution against an alleged divine healer since the passage of the Basic Science Law and shows conclusively that, with proper coöperation by the county officials and the Court, quacks and swindlers will not be able to get by in this State because of their false claim of divine healing.

Very splendid coöperation was received in this case from Thomas H. Quinn, County Attorney of Rice County, and Sheriff Ernest W. Haverland and his office.

"DOCTOR" RECEIVES THIRD SUSPENDED SENTENCE

State of Minnesota *vs.* Dufort

J. E. Dufort, fifty-seven years of age, residing at Mizpah and formerly of Northome, entered a plea of guilty to an information charging him with practicing healing without a Basic Science Certificate, on October 4, 1932, before the Hon. Alfred E. Thwing, Judge of the District Court at International Falls. Judge Thwing sentenced Dufort to one year in the county jail and suspended the sentence until the May, 1933, term of Court in that county.

Dufort has two previous convictions for practicing in violation of the Basic Science Law, both of which resulted in one-year county jail sentences which were also suspended on the promises of the defendant to refrain from practicing. The first sentence was imposed December 22, 1928, by Judge Wright at Park Rapids; the second, October 8, 1930, by Judge Wright at International Falls.

In view of the importance of the case and the fact that it is the first time in the five years the Basic Science Law has been in effect that three suspended sentences have been given the same person, there is published herewith the transcript of the proceedings at the time Dufort was sentenced by Judge Thwing. Following Dufort's second conviction, a licensed physician located at Northome to serve the people in that vicinity. This doctor still resides there.

The State Board of Medical Examiners conducted the investigation of the three cases against Dufort and they intend to fulfill their duty under the law in the future. Complaints will be filed against those who practice without the necessary credentials whether it be Dufort or some other person.

The Board acknowledges the splendid coöperation of the office of Mr. J. J. Hadler, county attorney for Koochiching County, Mr. L. P. Blomholm, attorney at law, International Falls, who acted for the County in the absence from the city of Mr. Hadler, and Miss Mary Hobbins of the county attorney's office.

State of Minnesota, County of Koochiching. In District Court Fifteenth Judicial District

State of Minnesota, *Plaintiff*,

vs.

J. E. Dufort, *Defendant*.

The above entitled matter came before the court, Hon. Alfred E. Thwing, judge presiding, at the courthouse in said county and state on this 4th day of October, 1932. Mr. L. P. Blomholm appearing for the county attorney, Mr. J. J. Hadler, and the defendant appearing without counsel, and duly entered a plea of guilty, whereupon the following remarks by counsel and the court were made, and sentence and judgment made:

Court: Is there anything further counsel desire to say for the purpose of the record?

Mr. Blomholm: I have nothing to say in behalf of the county attorney.

Mr. Brist: In view of the frankness with which this case has been discussed on the part of every one, if it is proper I would like to have the record show that I appear for the Minnesota State Board of Medical Examiners; that on two previous occasions I investigated the activities of the defendant, both of which investigations resulted in prosecutions and that both prosecutions resulted in pleas of guilty by the defendant being entered, and that the defendant has twice been placed on probation by this court. And I appreciate thoroughly as a lawyer, and I have so previously advised my client, that the matter of penalty is not a matter for the board and it isn't a matter for the attorney for that board. I do feel, however, in view of the repeated promises made by the defendant to this court, which promises he has not kept, and the fact that he has returned to the scene of his former activities, after having the terms of his previous sentence explained to him thoroughly by Judge Wright, that it would seem that the defendant, knowingly, wilfully violated this law. I had some talk with the defandant last Friday, and he admitted to me in the presence of a third party that since returning to Mizpah he has made his living in this manner; that he has taken care of people medically and that he has been paid a fee, and that he has paid his rent—he says he is obligated to pay $10 a month rent down there—and while he hasn't made very much money, he has been very candid in stating that the money he did get he got from treating people for physical ailments—there is no question about it not being right. In view of the facts and all the circumstances surrounding this particular case, it is my own personal opinion, and I am sure I am reflecting the attitude of the Medical Board when I state it doesn't occur to me the defendant is entitled to a great deal of leniency. I realize he has been in that community for a long while. He undoubtedly has done a great deal of good. I don't think that is open to question. But if we are going to enforce the medical practice act and basic science law of the State of Minnesota, I feel we have to do it with some degree of equity to all defendants, and it seems to me by this time, at his age, of 57, he should realize that that is the law of the state and he cannot practice unless he is properly licensed.

The Court: What is your disposition, Mr. Dufort, as to continuing practicing?

Mr. Dufort: Well, your Honor, as Mr. Brist says, I have been released before, and I have broken it, but at the same time I realize it is no use for me to try it again. So far as practicing is concerned, I realize I have to quit, if I don't quit willingly.

Court: Do you propose to quit?

Mr. Dufort: I propose to quit and propose to leave Mizpah.

Court: Are you sincere in that statement?

Mr. Dufort: I am sincere.

Mr. Blomholm: What do you propose to do.

Mr. Dufort: I have a proposition to go help a friend of mine; he has got a store and postoffice.

Mr. Blomholm: What is his name?

Mr. Dufort: Joseph Locher.

Mr. Blomholm: Where is that?

Mr. Dufort: Popple postoffice; it is about 30 miles from Northome.

Mr. Blomholm: You intend to work there in that store?

Mr. Dufort: Yes.

Mr. Blomholm: Have you been promised a position in that store?

Mr. Dufort: Yes, sir.

Court: This is one of the unpleasant responsibilities the court has to take, peculiarly so, difficult and unpleasant in this case because I have known the defendant myself, for a number of years, not well, but I have known him, and his reputation and standing in the community in which he lives. I am inclined to

think that the fact that he has that reputation on behalf of the people is, in part perhaps, largely responsible for the difficulty he has met in endeavoring to fulfill his promises in the past. I am glad one of the counsel for the state has conceded that the defendant has done a great deal of good in his community. I thoroughly believe that is true. Nevertheless, the law is here, and the officials and the court are charged with the responsibility of enforcing them. We have no discretion in saying whether that should be the law or not, or whether it should be enforced. I am going to be lenient in this case in opposition to the recommendations of the attorney for the state, in opposition to the recommendations that I believe to be sincere and disinterested from the medical board; and, perhaps, I should be open to criticism for doing so, nevertheless, the responsibility is mine. I know you appreciate, Dr. Dufort, that notwithstanding the good you have done in the past, the law is here for a good purpose, to prevent people assuming to practice who don't do good, who do harm and mislead the public, and in order to carry out the purposes of it, there can't be discrimination in its enforcement. It isn't proper for the representative of the state and it isn't proper for the court to say in one case the law shall be enforced and in another case that it should not. I hope that you will appreciate in the future the difficulty and embarrassment affecting the county to place you in court if you fail to comply with the conditions of the suspension. There must be a limit, of course, to the discretion we have as to whether those conditions will be insisted upon, and I doubt exceedingly whether circumstances in the future will justify my foregoing the responsibilities involved and insist upon those conditions being complied with. I understand you and your friends propose to make an effort in the legislature to obtain relief. If such relief is granted that will solve this particular case. If it isn't, I hope that in the interests of good government and respect for the law generally you and your friends and my friends down there in that locality will abide by the result and refrain from putting the authorities in the impossible position of shutting our eyes to the matter whether any law should be enforced.

It is the judgment and sentence of this court that you, J. E. Dufort, as punishment for the crime of practicing healing without a valid existing certificate of registration in the basic sciences, as required by law, of which you have been duly convicted on your plea of guilty, be imprisoned in the county jail of Koochiching County, Minnesota, for the period of one year. Provided, however, the execution and operation of this sentence shall be and are suspended to the first day of May, 1933, general term of this court, on condition that in the meantime you be and remain of good behavior; that you refrain absolutely from further violation of this or any other law, from holding yourself out, inviting consultation or other conduct in violation of law; and that you report to the county attorney of this county from time to time as he may direct as to your compliance with these conditions.

It is further ordered you be and are placed under probation under the supervision of Claude Fish and Joseph Locher, Jr., of Itasca County, if they shall accept such supervision, and serve without pay, and that each of them is hereby directed to cooperate with the court and the officials in seeing to it the conditions of the suspension of this sentence are fulfilled. That is all.

REPORTS AND ANNOUNCEMENTS OF SOCIETIES

MEDICAL BROADCAST FOR THE MONTH

The Minnesota State Medical Association Morning Health Service

The Minnesota State Medical Association broadcasts weekly at 11:15 o'clock every Wednesday morning over Station WCCO, Minneapolis and Saint Paul (810 kilocycles or 370.2 meters).

Speaker: William A. O'Brien, M.D., Associate Professor of Pathology and Preventive Medicine, Medical School, University of Minnesota.

The programs for the month of November will be as follows:

November 2—Aids in the Diagnosis of Heart Disease.
November 9—Psittacosis.
November 16—The Child's Education in Health Matters.
November 23—Disease Carriers.
November 30—Tumors of the Salivary Glands.

THE AMERICAN COLLEGE OF PHYSICIANS

Announcement has been made that the American College of Physicians will hold its Seventeenth Annual Clinical Session at Montreal, with headquarters at the Windsor Hotel, February 6-10, 1933.

Dr. Francis M. Pottenger of Monrovia, Calif., as President of the College, has charge of the program of General Sessions. Dr. Jonathan C. Meakins, Professor of Medicine and Director of the Department, McGill University Faculty of Medicine, is General Chairman of local arrangements and in charge of the program of Clinics. Mr. E. R. Loveland, Executive Secretary, 133-135 S. 36th Street, Philadelphia, Pa., is in charge of general business arrangements, and may be addressed concerning any feature of the forthcoming session, including copies of the program.

PARK REGION DISTRICT SOCIETY

W. S. Broker, Battle Lake, has been elected president of the Park Region District and County Medical Society. J. B. Vail, Hennin, and W. I. Nelson, Underwood, are vice president and secretary-treasurer, respectively.

RICE COUNTY SOCIETY

The Rice County Medical Society held its first fall meeting at the Faribault Clinic rooms, September 22. Dr. Thomas Meyers, Saint Paul, talked on "Simplified Infant Feeding," and Dr. G. Dunne, Saint Paul, gave a talk, illustrated by moving pictures, on "Obstetrics."

ST. LOUIS COUNTY SOCIETY

Carl A. Scherer, Duluth, was elected president of the St. Louis County Medical Society at the society's annual meeting October 13. Other Duluth physicians elected to office for the next year are: W. J. Ryan, first vice president; R. L. Burns, second vice president; M. McC. Fisher, secretary-treasurer. The new board of censors will be W. G. Strobel, L. L. Merriman, E. E. Webber.

SOUTHERN MINNESOTA MEDICAL ASSOCIATION

At the annual meeting of the Southern Minnesota Medical Association held at Rochester, September 12, the following officers were elected: Dr. Rasmus V. Williams, Rushford, president; Dr. Harold C. Habein, Rochester, and Dr. Walter H. Valentine, Tracy, vice presidents; Dr. Monte C. Piper, Rochester, secretary (re-elected).

SOUTHWESTERN MINNESOTA MEDICAL ASSOCIATION

At a meeting of the Southwestern Minnesota Medical Association held in Lakefield, October 3, the following were elected to office for the ensuing year: President, Dr. J. T. Rose, Lakefield, vice president, Dr. H. DeBour, Edgerton; secretary-treasurer, Dr. E. G. McKeown, Pipestone.

WASHINGTON COUNTY SOCIETY

E. J. Engberg, St. Paul, secretary of the Minnesota State Board of Medical Examiners, addressed members of the Washington County Medical Society at Stillwater on difficulties of law enforcement against medical law breakers at the first meeting of the society following the summer recess. F. J. Savage, Saint Paul, Councilor for the Fifth District of the Minnesota State Medical Association, also spoke.

The October meeting of the society was devoted to Child Behavior Problems, with J. E. Anderson, Minneapolis, of the Institute of Child Welfare, University of Minnesota, as principal speaker.

COMMITTEE ON STATE HEALTH RELATIONS

In the January, 1932, number of MINNESOTA MEDICINE, this committee published extracts from the Minnesota Laws governing medical care of the poor. The following series of questions and answers was drawn up by a committee of the Kandiyohi-Swift County Medical Society, and is published in the hope that it will further clarify our understanding of the present status of the subject in Minnesota. Further information is to be published later. Questions regarding medical care of the poor are invited; some of these will be published from time to time as space permits.

1. Who is a pauper in Minnesota?
   A pauper is one who is in need of *any* or all of the commonly recognized necessities of life, such as food, shelter, clothing, medical or surgical attention, etc., and who is unable to provide the same for himself.
2. Who are the blood relatives, in order, that should support a pauper?
   Children, parents, brothers and sisters, grandchildren or grandparents, except in those unable to earn a livelihood by reason of intemperance or bad conduct, in which case the obligation extends no further than parent and child.
3. Do the words "pauper" and "poor" have practically the same meaning?
   Yes, according to various definitions and court decisions.
4. How are the poor cared for in Minnesota from a medical standpoint?
   By relatives or by duly constituted authorities.
5. Who are the duly constituted authorities?
   They are of two types.
6. What are the two types?
   The County System and Town System. Under the former the County Board, under the latter the Town Board, City or Village Council, are the constituted authorities.
7. May a county be under both systems at one time?
   No.
8. What system have cities and villages?
   Depends on whether the county in which located has County System or Town System.
9. Who determines who is a pauper?
   It is solely within the judgment of the county or town, village or city authorities.
10. If the proper relative under the law refuses to give aid, is the county or town responsible?
    Yes.

10*a*. If a pauper's relative who is financially able and is liable, refuses to do so, may town or county pay the bill and collect from such relative?
    Yes.

11. Are there two kinds of care?
    Yes, permanent and temporary.
12. What is the County System?
    The County Board of Commissioners have a poor fund which they administer for the benefit of the county as a whole.
13. Does the County Board have the right to appoint a County Physician?
    Yes.
14. May the County Board appoint more than one doctor or all doctors of the county as County Physician?
    Yes. (Section 3048 G. S. 1913.)
15. May a county pay for a pauper who has a legal residence in another county?
    The chairman of the County Board must warn the pauper to depart and if he refuses, or fails to do so within a reasonable length of time, and is likely to become a public charge, he may be ordered conveyed. If he is so sick or infirm as to make it inhuman to remove him he may be given immediate necessary care and the same will be a charge against the other county.
16. Which officer under the County System has the care of the poor?
    Each County Commissioner has jurisdiction over the poor in the district from which he is elected.
17. Under what system are the counties of Kandiyohi and Swift?
    The Township System.
18. What is the Township System?
    In this Township System the Town Board is specifically charged with the care of the poor, as one of its duties, within its confines.
19. Is it binding on the Town Board to give care?
    Yes, to any pauper.
20. Who is the proper officer to notify?
    The chairman of the Town Board.
21. May the Town Clerk be notified or give consent?
    No, he is not a member of the Town Board but acts as its clerk.
22. May any member give authorization for treatment?
    If he gives consent it is usually considered binding on the Board.
23. How may notification be given?
    Either written or verbal.
24. If written, is there a legal form?
    No, a simple statement of the condition and care necessary is all that is needed.
25. Is a written form of notification all that is necessary to hold a town or county liable?
    No, the care must then be authorized by the proper authority.
26. If verbal authorization is given either personally or by telephone, what should be done?
    The doctor should at once write a letter to the proper authorities confirming such verbal consent and keep copy of letter for his own file. It might be necessary later on to prove such authorization.
27. Who is the proper one to notify to get consent from in villages or cities?
    The president of the village or mayor of the city unless they have a special constituted officer for such purposes.
28. May a town have a regularly appointed physician?
    Yes.
29. Can the town force a pauper to use such physician?
    Yes, if the town is to pay for such care.
30. Do towns have poor funds?
    Yes.
31. If such fund is used up, what may be done?
    The fund is replenished from other township funds.
32. If there are no such funds available, is the county or town still liable?
    Absolutely.
33. When do counties help pay under the Township System?
    When the amount expended is in excess of one mill on the taxable value of property of that town or village or city the county is liable to such town, village or city for 75 per cent of such excess.

34. How may officers be forced to provide care?
    If the county or town fails to provide care, the members may be sued for malfeasance or nonfeasance of office.
35. How is place of residence in county determined?
    If a person has resided in the county for one year he has a legal residence established in that county.
36. How is place of residence in town established?
    It shall be that township wherein he has resided longest in that year.
37. When a dispute arises between towns, how is it decided?
    By application to a justice of peace of a town not involved in the dispute or in certain cases by the State Board of Control.
38. Can the town or county return a person to the legal place of settlement?
    Yes, providing his or her condition is such that they may be taken without danger to the life of the individual.
39. May any doctor render first aid or emergency treatment without notice and authorization and hold the proper authorities responsible?
    Yes, absolutely. It is a well established fact that emergency treatment must be paid for by the county or town without authorization.
40. What should be done after emergency treatment is given?
    Notice to proper authority must be given at once after emergency treatment has been given and authorization obtained for further care and treatment.
41. May the county or town authorize its own doctor to take over and care for such case after first aid has been rendered by another doctor?
    Yes.
42. May one town pay a bill and recover from another if legal settlement of pauper is in the other town?
    Yes, if in immediate need and his condition is such that it would be inhuman to remove him. In which case notice should be given to County Auditor. In other cases the poor person should be conveyed to settlement. County Auditor should be notified within three days.
43. May the proper authorities pay for obstetrical cases?
    Yes, if notice has been given and authorization allowed.
44. When may obstetrical cases be considered an emergency?
    When the doctor has never seen a case and is called to come at once and delivery takes place so quickly that to call or give notice is impossible, it may be considered as an emergency and bill paid by proper authority.
45. Is an operation quickly done as a matter of life and death an emergency?
    It may be so considered, yet you are on surer ground to give notice and receive permission.
46. When are the proper authorities responsible outside of emergency cases and when notice has been given?
    If a doctor has a pauper in need of care and gives notice to the proper authority and that authority does nothing to provide such proper care, then the doctor may continue that care and hold the proper authority responsible for that bill. This is an important exception.
47. If a person has no legal residence in state, who is responsible?
    If under the County System, the county is; if under the Town System, the town wherein that man is found when such relief is needed.
48. May the county pay hospital care for a patient that county is under the Township System and the medical care is given free, instead of sending him to the University General Hospital?
    No. Unfortunately he must be sent to the University if the county is to pay.
49. If treatment is authorized by the proper authority and then it is discovered that man is not a pauper, is the town or county still liable?
    No.
50. May the money for medical care be paid to a pauper to be transmitted to the doctor?
    No. The money must be paid from the Board to the doctor.
51. May a county or town provide poorhouses?
    Yes.
52. How may a county change from one system to the other?
    By a vote of the Board to submit the question to the voters of the county or by a petition of a certain percentage of the voters.
53. Which system seems to be the most satisfactory?
    The County System.
54. How are the counties working out their problems with doctors?
    In several ways as shown below:
    1. By appointment of one or more doctors, at a stated amount per year.
    2. By contracts with hospital or hospitals in county for a specified amount or at a reasonable rate per day.
    3. By the appointment of all doctors who will do authorized work for a stated fee or a percentage of the regular fee schedule.
55. May towns use the same system?
    Yes.
56. What are certain counties in Iowa doing?
    The doctors belonging to a county medical society sign a contract with the county as individuals to do all authorized county work for a definite sum for the year. In counties of about 24,000 people this sum is around $3,000 per year. This sum is paid to the treasurer of the medical society, who pays members' dues to state and national societies, malpractice insurance on each, and incidentals of running the society, then the rest is used to carry on a public health program of many varieties or is pro-rated back to the members in proportion to the amount of such work in the care of the poor as each has done during the year and reported.
57. May a corporation practice medicine?
    There are many court decisions that a corporation cannot practice medicine.

Respectfully submitted,

Committee on Care of the Poor

A. F. Branton, M.D., Willmar, Minn.
Oscar Daignault, M.D., Benson, Minn.
Fred Behmler, M.D., Appleton, Minn.

AMPOULES SODIUM CACODYLATE, FOR INTRAVENOUS USE (P. D. & CO.) OMITTED FROM N. N. R.

The Council on Pharmacy and Chemistry reports that these were accepted (although the Council believes that the intravenous administration of sodium cacodylate is unnecessary and undesirable) because Parke, Davis & Co. made no propaganda for the use of this method of administering sodium cacodylate, but merely supplied these ampules to meet a demand. The Council has become convinced that the inclusion of sodium cacodylate ampules definitely proposed for intravenous use is likely to be taken to mean that in the opinion of the Council the intravenous use of sodium cacodylate is rational. Therefore, the Council has omitted these ampules, even though the firm is making no claims which invite such use. (Jour. A. M. A., May 7, 1932, p. 1654.)

PROGRESS SECTION

Members are urged to abstract valuable articles which they run across in their reading and send the abstracts to the physicians in charge of the respective sections. In order to avoid duplication it would be well to communicate with one of the section supervisors before the article is abstracted.

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EYE, EAR, NOSE AND THROAT

THE HYALOID MEMBRANE OF THE VITREOUS: Alfred Cowan, M.D., and W. E. Fry, M.D., Philadelphia (Trans. Amer. Acad. Ophthal. and Otolaryng., 1931, p. 159).

In a former paper by one of the authors, slit lamp studies following intracapsular lens extraction for cataract revealed the presence of a membrane just posterior to the iris and separating the vitreous from the aqueous. The anatomical and histological evidence of such a membrane was obtained by examining animal and human eyes after hardening in formalin and alcohol and stripping the eye of all parts except such a membrane. The latter was found attached to the pars plana of the ciliary body.

The membrane was further sectioned and stained with a large number of different stains, the best of which proved to be Verhoeff's elastic tissue stain. This produced the deep blue uniform stain of a membrane, distinct from the posterior lens capsule and anterior edge of vitreous. Numerous trabeculæ or fibres extended from the posterior surface of this membrane through a clear zone and into the vitreous body.

From their studies, the authors believe that there is a non-nuclear, structureless, uniformly staining membrane separating aqueous from vitreous, and which they designate as the anterior hyaloid membrane of the vitreous.

FRANK W. STEVENSON, M.D

A SYMPOSIUM ON THE NERVUS ACUSTICUS (LARYNGOSCOPE, Vol. XLII, No. 6, June, 1932). The Applied Anatomy of the Eighth Nerve and its Environs, the Cerebello-pontile Angle, C. B. Courville; Pathological Conditions Involving the Eighth Nerve and the Cerebello-pontile Angle, N. Evans and C. B. Courville; The Pathological Anatomy of its Neoplasms, L. J. Adelstein; Histopathology of the Eighth Nerve, E. M. Hall; Symptomatology from the Standpoint of Neurosurgery, S. D. Ingham; Vestibular Symptomatology, E. R. Lewis; Eighth Nerve Symptomatology from the Standpoint of Neurosurgery, C. W. Rand (Laryngoscope, Vol. XIII, No. 6, June, 1932). The details of structure of the Nervus Acusticus vary considerably in the different vertebrata, but its general position and relationships are remarkably constant. The difference in the extent of the glial portion of its two divisions is to be explained on an embryological basis and may account for the tumors of the eighth nerve. The soft texture of its central portion and the crossing of its constituent fibers account for its frequent damage in cranio-cerebral injuries, and for its susceptibility to injury and distortion by local new growths.

Lesions of the intracranial portions of the Nervus Acusticus are now recognized to be fairly common. Delayed or missed diagnoses in such cases can usually be attributed to failure to consider all the possibilities. A general classification of the lesions is as follows:

I. Traumatic—The petrous portion of the temporal bone is often involved in fractures of the base of the skull. Complete laceration of the eighth nerve is not uncommonly seen in cases coming to autopsy. One may reasonably assume that patients who survive a basal skull fracture may have some degree of pathological change in the eighth nerve. Furthermore, studies on the histological changes in the brain following head injury have shown small petechial hemorrhages in the central nuclei of the acoustic and vestibular nerves. The nerve cells composing these ganglia, under higher magnification, show vacuoles in their nuclei and cytoplasm indicating possible damage to the ganglia as well as to the rest of the brain (edema). More or less permanent injury may result from these changes.

II. Vascular—In addition to hemorrhage produced by trauma other vascular lesions are to be thought of. Thrombosis of local vessels is not accompanied by eighth nerve symptoms unless the vertigo is due to disturbance of the terminal nuclei. Aneurysms of the upper portion of the vertebral artery have given symptoms typical of cerebello-pontile angle lesions.

III. Infectious—Infectious meningitis, chronic arachnoiditis with the formation of occlusion cysts, and subacute or chronic infections involving the pons and middle cerebellar peduncle.

IV. New Growths Occupying the Cerebellar-pontile Angle—These may arise from practically every regional tissue or structure. A classification of new growths occupying this region is as follows:

A. Primary—Neurinoma, meningioma, cholesteatoma, and adjacent brain structure tumors. Papilloma of the choroid plexus and glioma of the pons. Tumors arising from the petrous portion of the temporal bone.
B. Secondary and metastatic tumors.
C. Cysts of the cerebello-pontile angle.
D. Infectious granulomas: 1. Tuberculosis, 2. Gumma.
Tumors of the Nervus Acusticus account for ap-

proximately ten per cent of all brain tumors. They are the most amenable to surgical interference of all intracranial tumors. These tumors are round in shape and as they enlarge tend to conform to the shape of the tentorium above, the pyramidal bone laterally, the base of the posterior fossa below and medially, to crowd the cerebellum, brain stem and cranial nerves. That eighth nerve tumors are not only extra-cerebellar and subdural but are contained within an arachnoid capsule, has never been fully appreciated.

The cranial nerves from the fifth to the twelfth are are in close proximity to one another in the angle, and naturally a growth arising from the eighth nerve will in turn involve the major portion of this large group, particularly the fifth and seventh, the others usually to a lesser degree.

Vestibular service, like all physiologic services, is without "symptoms" under normal conditions. Disturbance of its working conditions results in qualitative and quantitative responses which include vertigo, nystagmus, falling, past pointing, pallor, sweat, nausea, vomiting, and faintness. Analysis of abnormal reactions often reveals the location of a lesion as definitely peripheral, subtentorial, or supratentorial.

The accepted surgical approach of these tumors is by cerebellar exploration. The matter of partial or complete removal of the tumor depends on conditions found at operation. Even with incomplete removal of the tumor, the patient in the majority of cases will have marked improvement over a period of years, and if necessary a second operation can be carried out. With the abundant evidence elicited by neurological, neuro-otological, and roentgenological studies, lumbar punctures are unnecessary. There is the danger from the effect of lumbar puncture of herniation into the foramen magnum.

LAWRENCE R. BOIES, M.D.

MEDICINE

NEUROLOGIC ASPECTS OF PRIMARY ANEMIA: Richard S. Ahrens, M.D., Minneapolis, Minn. (Arch. Neurol. and Psych., July, 1932). This is a study of 189 cases of proved pernicious anemia from the standpoint of the neurologist.

Involvement of the cranial nerves was not of any significance. Much was accidental or incidental. Twelve cases showed pupillary irregularity but there were no typical findings. Co-ordination was impaired, chiefly in the lower extremities, and they are usually more profoundly involved than the upper. Disturbances in gait are relatively common and must be regarded as an evidence of general weakness. Involvement of the sphincters is not found very often. One might expect it to occur more often, but it was usually found in cases where there was extreme cord invovement. The deep reflexes showed all variations, particularly in the lower extremities. The upper extremities are usually not involved except in cases of peripheral neuritis, when they may be increased or decreased. There is a tendency for a loss of the Achilles reflex. Paresthesias were noted in 133 instances. They usually occur in the fingers and toes and are of the "pins and needles" type. Paresthesias tend to disappear and reappear, often appear early in fingers, and rarely are associated with any changes in the reflexes. Impairment of vibratory sense in the upper extremities is relatively rare, and is of no diagnostic importance. Loss of the vibratory sense over the first toes is significant and occurred in 61 of the patients. When this is noted there is usually a rising curve towards normal as the lower extremities are ascended. Mental changes are common, and they vary from mild personality changes to a definite well organized delusional psychosis. Most common, however, are delayed cerebration, loss of memory, irritability, depressed states, and frequently euphoria is observed.

Ninety-seven per cent of the cases studied show some involvement of the cord. Only changes in the deep reflexes and loss of vibratory sense were considered. Paresthesias were not considered as an evidence of cord involvement.

The author also comments on the many optimistic reports of neurological improvement following liver treatment and believes that liver therapy has no effect on the neurologic findings. Mental changes frequently show marked improvement.

RICHARD BARDON.

SLEEP: ITS VALUE IN TUBERCULOSIS: N. Kleitman, Ph.D. (Jour. of the Outdoor Life, Feb., 1932, p. 89). Sleep is generally looked upon as the most complete form of rest and is therefore of paramount importance to the tuberculosis patient. The sleeping person takes no notice of events and does not respond to changes in his environment.

The position of the body in sleep is of relatively little importance, since no position is held for any great length of time. The average time between stirs as determined by actual tests is about 10 minutes and the longest about one hour. Since these movements are of very short duration the total time one spends in moving about probably does not exceed five minutes in a night. Sleep, then, may be looked upon as a period of almost complete muscular inactivity.

During sleep there is a decrease in activity of the heart, which leads to a lowering of the arterial blood pressure. These in turn decrease the danger of hemorrhage in disease. The absence of disturbing external influences also has a beneficial effect upon the circulation and respiration.

Sleep decreases the basal metabolism and tends to reduce the temperature. Muscular activity results in the production of large quantities of heat, which cannot be dissipated as fast as they are produced. This leads to a temporary rise in temperature. Through rest in bed and sleep one can hold the temperature at a lower level.

Practically all of the glands in the body secrete less during sleep than during the waking state. A notable exception is found in the sweat glands, a fact which is well known to the tuberculous. The cause of increased secretion of sweat in sleep probably represents an attempt of the body to get rid of an excess of heat accumulated because of insufficient ventilation of the space between the skin and the bed clothes and also of the bedroom.

There is decreased wear and tear of the living matter of the body during sleep and a consequent upbuilding, which is especially beneficial to the tuberculous. Under these conditions it is desirable to increase the duration of sleep as much as possible.

Everything tending to cut out sensation favors the onset of sleep. The newborn baby sleeps for eighteen to twenty-four hours a day, waking up every four or five hours because of hunger or discomfort, but such a baby is blind and deaf for the time being and experiences none of those sensations that may disturb an adult. Sound sleep is promoted by regular hours and regular habits. Worry, fear, anger or undue excitement may produce restless sleep because they interfere with relaxation. When one cannot sleep, it is well for the sufferer from insomnia to give up trying and to resign himself to lying awake. It should be noted that the decrease in muscular, circulatory, respir-

atory and metabolic activities occurring in sleep is largely due to rest in a horizontal position, and lying quietly awake, therefore, is nearly as good as sleep.—Reprinted from *Tuberculosis Abstracts*, Oct., 1932.

PEDIATRICS

STOVARSOL IN THE TREATMENT OF SYPHILIS IN INFANTS AND IN CHILDREN: Harold A. Rosenbaum, M.D., Chicago (Amer. Jour. Dis. of Children, July, 1932, No. 1, Volume 44). If the oral treatment for syphilis were as efficient or more efficient than the other modes of treatment, it would have many incidental advantages. Stovarsol administered by mouth has given such superior results that the author decided to test it in his clinic.

Stovarsol is an odorless, white tablet tasting like acetylsalicylic acid and is easily soluble in water or milk.

Alois Bratusch-Marrain system of dosage is as follows: For seven days, 0.005 gm. of stovarsol per kilogram of body weight is given daily; for seven days, 0.01 gm.; for seven days, 0.015 gm., and for forty-two days, 0.02 gm. A rest period of from four to six weeks follows this course of treatment. The aforementioned courses and rest periods are repeated until the serologic tests are negative and three times thereafter. Then a rest period of six months is given, followed by one more course. He thinks that the best dosage is from 0.01 to 0.02 gm. per kilogram of body weight, that smaller doses have no effect, and that larger doses offer no advantage.

It is interesting to note that Soldin and Lesser, comparing the mortality of patients under treatment with the old method from 1919 to 1924, with the mortality following treatment with stovarsol from 1924 to 1928, noted a much lower mortality with the latter.

In the older methods of treating syphilis, it always seemed advisable to use first one metal, and, as the tissues became resistant to the metal used, to employ another. In the author's experience the use of stovarsol has been so successful that this has not been done. It would seem, however, that if a resistant case should occur mercurial rubbings could be used alternately with stovarsol.

In forty-one cases of congenital syphilis in which treatment was given by mouth, stovarsol gave satisfactory results. In nine the treatment was begun during the first year and continued for a year or more; serologic reversal was obtained in all cases, and clinical results were excellent.

Of six patients who were more than one year of age when treatment was begun and in whom it was continued for a year or more, serologic tests became negative in only three, though clinical results in all of them were excellent.

The remaining cases were not reported as a group since the patients were not under treatment for a period of a year. Clinical improvement occurred in all patients. The serologic tests were reversed or influenced in most cases. Few reactions occurred.

R. N. Andrews, M.D.

MASSIVE INTRA-ABDOMINAL HEMORRHAGE IN THE NEW-BORN: Sydney Nussbaum, M.D., Brooklyn (Amer. Jour. Dis. of Children, July, 1932, No. 1, Volume 44). Exsanguination, due to massive intra-abdominal hemorrhage, was the direct cause of death in two cases. In the first case, death was the result of violent methods of resuscitation. The patient showed no effects from this condition for three days, when hemorrhagic tendencies in the new-born are likely. Recent investigations have demonstrated that in hemorrhagic disease of the new-born, laboratory tests are frequently negative, and that the main causative factor in this condition is the lack of, or poor quality of, the prothrombin enzymes, with resultant defective clot formation.

The best recommendation to prevent a recurrence of this situation, taught by this case, is to eliminate all forceful methods of resuscitation and the generalization of the use of the catheter cleansing of the throat, stimulation of the skin by cold and warm baths and occasional use of alpha lobeline. Both cases occurred on the fourth day of life, and were very likely associated with this hemorrhagic tendency.

In the second case, the hemorrhage came from the right suprarenal gland, where a large intrasuprarenal hemorrhage preceded the abdominal hemorrhage. Both patients died on the fourth day of life, when the greatest incidence of hemorrhagic disease of the new-born occurs. This was considered an important factor.

R. N. Andrews, M.D.

STOVARSOL IN THE PERORAL TREATMENT OF CONGENITAL SYPHILIS: Arthur F. Abt, M.D., and Alfred S. Traisman, M.D., Chicago, Illinois (Jour. Ped., August, 1932, Vol. I, No. 2). The arsenic content of stovarsol is approximately 27.1 to 27.4 per cent, while the content of neoarsphenamine is 19 per cent and that of sulpharsphenamine is 21 per cent.

The preparation which the authors employed was furnished to them by the manufacturers in the form of 0.1 gm. and 0.25 gm. tablets. Each 0.25 gm. (4 gr.) tablet contains approximately 0.068 gm. of arsenic, while the 0.1 gm. tablet contains approximately 0.027 gm. arsenic.

The individual course is of nine weeks' duration followed by a six weeks' rest period. The method of administration has been as follows:

In the small infants, the mother was advised to crush the amount of stovarsol ordered, to dissolve it in water and to give it one-half hour before feeding. When the dose ordered was large, in the older child, the instructions were that the medication be divided equally in 2 or 3 doses and be given with water, one-half hour before meals.

It is important that patients undergoing arsenical treatments should be under close observation during the course of the medication.

The first week, 0.005 gm. per kilo of body weight was administered daily. The second week, 0.010 gm. per kilo of body weight was administered daily; the third week, 0.015 gm. per kilo of body weight was administered daily; and the fourth week, 0.20 gm. per kilo of body weight was administered daily (the maximum dose). For the following five weeks the dosage was 0.02 gm. per kilo daily.

In the authors' series of 22 cases, the clinical symptoms improved rapidly. Cutaneous lesions cleared in one to three weeks. The improvement in the general condition of the children was impressive. The appetite increased and the gain in weight was marked, average gain being 4 pounds 4 ounces for the nine weeks' course of treatment.

The Wassermann reaction in their series of cases after treatment with one course of stovarsol became negative in 59 per cent of the cases. Most of the negative Wassermann reactions were obtained in infants

under one year. The Kahn test became negative in 30 per cent of the cases.

No serious urinary changes were noted in this series, with the exception of one child, who had a severe arsenical dermatitis. The blood of younger infants showed marked secondary anemia; improved rapidly with the treatment. Eosinophilia was a frequent finding in their series of cases. The bone lesions healed rapidly after one course of treatment, both clinically and by X-ray.

The authors' results warrant the belief that the peroral administration of stovarsol is the method of choice in the treatment of congenital syphilis.

Parents should be warned that at the first sign of temperature, vomiting, diarrhea, or appearance of rash, the medication should be immediately discontinued.

The general physical condition of infants and children under this form of therapy improves rapidly, and the gain in weight is noteworthy.

R. N. ANDREWS, M.D.

NIRVANOL TREATMENT OF ACUTE CHOREA IN CHILDREN: Roger H. Dennett, M.D., and Samuel Wetchler, M.D., New York (Jour. Ped., August, 1932, Vol. I, No. 2). During the last two years, the authors have used the drug in seventy-two cases, and in every case the choreiform movements ceased within twenty days after beginning the treatment. Leaving out of consideration the permanency of the results, they are convinced that it is the best treatment yet devised for controlling the individual attack.

It is the authors' opinion that nirvanol is a specific for the individual attack of chorea. In all of their cases the attacks terminated favorably and rapidly, complications were absent and the heart and renal functions remained undisturbed. The effects obtained from nirvanol therapy are obviously not hypnotic in character, but due to a specific action, presumably on the corpus striatume in the midbrain, producing a definite reaction with changes in temperature, skin manifestations and characteristic blood changes.

The treatment is simple and available to all, since it consists only of the administration by mouth of a 5 grain tablet of nirvanol two or three times a day. The child is put to bed, kept on a simple diet, and, if under six years of age, given a tablet night and morning, while larger children, over this age, are given three tablets a day, until a rash or fever or both are induced by the drug. This usually occurs on the seventh or eighth day, when the drug is stopped and no further treatment is given. Drowsiness begins on the third day, when the child appears sleepy but rouses for food, urination, and defecation. Each day the drowsiness increases until in some instances the patient is almost stuporous and can be made to eat only with difficulty. As the drowsiness begins there is an exaggeration of the choreiform movements. Nirvanol should always be discontinued at the onset of the rash even if unaccompanied by fever. The drug, however, should never be given longer than twelve days, even in cases in which no reaction is noted, because indefinite administration of it may produce injury to the bone marrow and aleukemic blood changes. No patients with mild or fleeting choreiform movements were treated with nirvanol.

R. N. ANDREWS, M.D.

ROENTGENOLOGY

INTRAVENOUS UROGRAPHY: A NEW DIAGNOSTIC PROCEDURE FOR THE GENERAL PRACTITIONER: Miley B. Wesson, San Francisco (Urol. and Cutan. Review, 36:296, May, 1932). After reviewing the development and technic and limitations of the method, Wesson discusses the contraindications and the special indications for its use, and the interpretation of the findings. There are twenty-nine good illustrations. His conclusion is that "Intravenous urography has, in a way, restored a large field of medicine to the general practitioner, but he must realize that this agent is merely another diagnostic adjunct, and he must still depend upon the urologist for the final diagnosis."

Contraindications: Intravenous urography is dangerous in those with advanced renal insufficiency or general weakness—anuria, uremia, cardiac decompensation and advanced age. "Particularly prone to reactions are cases of idiosyncrasy to iodin, hyperthyrosis, pregnancy and active tuberculosis, thyrotoxicosis, acute and chronic renal disease."

Limitations: Chronic nephritis with poor diuresis or deficient concentration, and polycystic kidneys with little remaining parenchyma will give worthless pictures because of the delayed and diminished excretion. Cases of pyelonephritis, tuberculosis, and pyuria in infancy have been disappointing because of inhibited excretion due to purulent infection. The pictures are disappointing if not misleading in cases of renal tumors because of failure to show minor calyces and their minor deformities. A normal kidney may give a very poor or misleading picture if the exposure is made during systole when the pelvis or ureter is contracted. Moreover, inhibition of functional activity of a kidney may be either temporary or permanent, and mere nonvisualization at a particular examination does not necessarily means a permanently damaged kidney.

Special indications for intravenous urography include conditions which make a cystoscopy or ureteral catheterization impossible or dangerous—intolerance or deformities of the bladder, urethral stricture, some prostatic hypertrophies, some extensive bladder tumors, ectopic or rectally implanted ureters, and occluded or damaged ureters, as by stone, stricture or operative damage. It may give particularly good pictures in cases of hydronephrosis, congenital dilatation of ureter, and floating kidney. Intravenous urography should be a great help by giving a safe method of immediate diagnosis when rupture of kidney or bladder is suspected. It is suggested that it may be of value in differentiating between glomerular and tubular affections of the renal cortex—accentuation of the shadow of the renal cortex in the latter but not in the former. Intravenous urography is of particular value in cases of renal and ureteral lithiasis. In cases of "acute" ureteral stone there will be a good urogram on the unaffected side, and on the affected side an increased density of the kidney, but no outline or a very much delayed one of the pelvis and ureter. Cases of "chronic" ureteral stone which partially block the ureter show a well outlined renal pelvis due to stasis and some degree of hydronephrosis.

With all its advantages, however, intravenous urography is only one diagnostic procedure and often not one of precision; it does not replace retrograde cystoscopic examination though in some conditions it gives information not obtainable by the retrograde method.

THEODORE H. SWEETSER, M.D.

BOOK REVIEWS

Books listed here become the property of the Ramsey and Hennepin County Medical libraries when reviewed. Members, however, are urged to write reviews of any or every recent book which may be of interest to physicians.

RECEIVED FOR REVIEW

HOSPITALS AND CHILD HEALTH. A Publication of the White House Conference. 279 pages. Price, $2.50, cloth. New York: The Century Company, 1932.

HEART DISEASE. Paul Dudley White, M.D., 931 pages. Illus. Price $12.00. New York: The Macmillan Co., 1931.

There have been so many recent manuscripts concerning heart disease that it is difficult for anyone other than a cardiologist to keep abreast of the newer contributions. White is one of the few men capable of correlating the rapidly accumulating scientific knowledge with the clinical aspect of cardiology.

In this work, he attempts to present the newer methods of diagnoses and treatment. The work begins with a study of the history and symptoms of cardiac disease, as well as the examination of the heart and the rest of the organs. Throughout the book historical excerpts from original manuscripts are quoted. The laboratory and mechanical aids in diagnoses are reviewed with a particularly good résumé of cardiovascular roentgenology. The study of the electrocardiogram is possibly too detailed for general use but the plates are excellent and the description clear. The rest of the book consists of a review of the cardiac afflictions. The description is comprehensive and complete in a clear concise manner. The treatment, however, receives too little attention.

The entire book is well written and the bibliography is most complete. The binding is somewhat below the general quality of the paper and print.

JOHN FRANCIS BRIGGS.

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